ORDER NO.VMD0104009C8

Service Manual

Digital Video Camera/Recorder

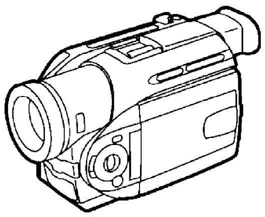
MultiMediaCard™

Panasonic Mini DV PAL SD

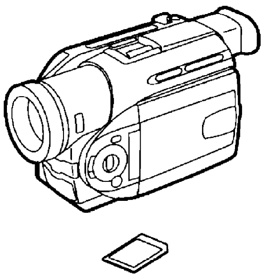
NV-DS27EG / NV-DS27EGM / NV-DS27EGE / NV-DS27B / NV-DS28EG / NV-DS28EGM / NV-DS28B / NV-DS28EN / NV-DS28ENC / NV-DS28ENT / NV-DS28A / NV-DS37EG / NV-DS37EGM / NV-DS37B / NV-DS38EG / NV-DS38EGM / NV-DS38B / NV-DS38EN / NV-DS38ENT / NV-DS38A

VOL.1

N-MECHANISM



NV-DS27
NV-DS28



NV-DS37
NV-DS38

SPECIFICATIONS

SPECIFICATIONS

ITEM	SPECIFICATION
POWER	Source: Battery Pack; 7.2 V DC AC Adaptor; 7.9 V DC Consumption: During Camera Recording Using The LCD Monitor ;3.6 W (NV-DS27/DS28) ;4.0 W (NV-DS37/DS38) During Camera Recording Using The Viewfinder; 2.9 W (NV-DS27/DS28) ; 3.3 W (NV-DS37/DS38)
RECORDING FORMAT	Digital Video SD Format
TAPE FORMAT	Mini DV Cassette Tape (Tape width 6.35 mm)
TAPE SPEED	SP mode : 18.83 mm/s LP mode : 12.57 mm/s Record/Playback Time: SP mode ; 80 min. with DVM80 LP mode ; 120 min. with DVM80
CAMERA	PICK-UP ELEMENT: CCD (Charge Coupled Device)
	STANDARD ILLUMINATION: 1,400 lx
	MINIMUM REQUIRED ILLUMINATION: 1 lx (Digital Gain-up Mode)
	LENS: 15 : 1 Power Zoom, Auto Iris, F1.8, Macro (Full Range AF) Focal Length; 3.1-46.5 mm Filter Diameter; 37.0 mm
	IMAGE SENSOR: 1/4-inch CCD Image Sensor
	VIEWFINDER: Colour Electronic Viewfinder 2.5-inch Colour LCD Monitor
VIDEO	RECORDING FORMAT: Digital Component
	TELEVISION SYSTEM: CCIR; 625 Lines, 50 Fields PAL Colour Signal
	VIDEO OUTPUT LEVEL: 1.0 Vp-p, 75Ω S-VIDEO OUTPUT LEVEL: Y; 1.0 Vp-p, 75Ω C; 0.286 Vp-p, 75Ω VIDEO INPUT LEVEL: 1.0 Vp-p, 75Ω (NV-DS38) S-VIDEO INPUT LEVEL: Y; 1.0 Vp-p, 75Ω C; 0.286 Vp-p, 75Ω (NV-DS38)
Card Memory Functions (NV-DS37/DS38)	Recording Media: MultimediaCard, SD Memory Card Image Compression: JPEG

ITEM	SPECIFICATION
AUDIO	RECORDING FORMAT: PCM Digital Recording; 16 bit (48 kHz/2 ch) 12 bit (32 kHz/4 ch)
	MIC IN LEVEL: -50 dB (0 dB = 1 V/Pa, 1 kHz) (Stereo mini jack) OUTPUT LEVEL (LINE): 316 mV, 600Ω INPUT LEVEL (LINE): 316 mV, 10 kΩ or more (NV-
DIGITAL STILL PICTURE	Digital Still Picture Output, Control Signal Input / Output (Transfer rate: max. 115 kbps)
DIGITAL INTERFACE	DV Output Terminal (i. LINK, 4 pin): NV-DS27/DS37 DV Input/Output Terminal (i.LINK, 4 pin): NV-DS28/DS38
MICROPHONE	Stereo
SPEAKER	1 round speaker ϕ28 mm
OPERATING TEMPERATURE	0-40 °C
OPERATING HUMIDITY	10-80 %
WEIGHT	Approx. 620 g (without Battery and DV Cassette): NV-DS27/DS28
DIMENSIONS	Approx. 77 (W) x 96 (H) x 179 (D) mm
STANDARD ACCESSORIES	1 pc. AC Adaptor 1 pc. Battery Pack Unit 1 pc. Shoulder Strap 1 pc. DC Input Cable 1 pc. AC Mains Cable 1 pc. AV Cable 1 pc. Remote Controller 1 pc. Bottom-type Battery 1 pc. Head Cleaner: NV-DS28EN/ENC/ENT/A, NV-DS38EN/ENT/A 1 pc. Hood Cap Unit 1 pc. SD Memory Card: NV-DS37, NV-DS38 1 pc. Interface Cable: NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38 1 pc. CD-ROM: NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

1. INTRODUCTION

1.1. INTRODUCTION1

This service manual contains technical information which will allow service personnel's to understand and service this model.Please place orders using the parts list and not the drawing reference numbers. If the circuit is changed or modified, this information will be followed by supplement service manual to be filed with original service manual.

Note 1:
Assembly, Disassembly and Adjustment procedures for Mechanism-Chassis are separate volume.
Please refer to following manual for detail of Mechanism Chassis.
Service Manual Order number for N-Mechanism-Chassis: VMD0105012C8

Note 2:
These movie camera uses AC Adaptor is VSK0581.
The service manual for AC Adaptor is separate volume.
Order number for AC Adaptor-----VSK0581 : VMD0004017C8

Note 3:
This service manual does not contain the following information, because of the impossibility of sevicing at component level.

1. Schematic Diagram, Block Diagram and C.B.A. layout of Main C.B.A.

2. Parts List for individual parts of Main C.B.A.

3. Exploded View and Parts List for individual parts of Mechanism Unit.

When a part replacement is required for repairing Main C.B.A., replace the assembly parts. (Main C.B.A.)
The following circuits are contained in Main C.B.A.

1. Main Connection Circuit

2. Drive Circuit

3. Video 1 Circuit

4. Video 2 Circuit

5. Control Circuit

6. Camera Circuit

7. Lens Drive Circuit

8. LCD Circuit

9. Head/ Rec Amp Circuit

10. Power Circuit

The following circuits are contained in DSC/Ex In C.B.A. (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38)

1. DSC Ex Connection Circuit

2. Ex Input Circuit

3. DSC Circuit

Since DSC/Ex In C.B.A. is not serviceable at component level due to 1 or 2 piece of CSP IC mounted on it with no space, 7 years retention period for the part supply is applied to this DSC/Ex In C.B.A. as ordinary ICs.

Note 4:
DSC/Ex In C.B.A. (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38) is not categorized as a recycle module part.
Please do not send the faulty DSC/Ex In C.B.A. to DVC Repair Center.

2. CAUTION FOR AC CORD (VJA0940 TYPE)

2.1. INFORMATION FOR YOUR SAFETY

IMPORTANT
Your attention is drawn to the fact that recording of pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

WARNING

To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.

CAUTION

To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

FOR YOUR SAFETY
DO NOT REMOVE THE OUTER COVER
To prevent electric shock, do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

2.2. CAUTION FOR AC MAINS LEAD

For your safety, please read the following text carefully.
This appliance is supplied with a moulded three-pin mains plug for your safety and convenience.
A 5-ampere fuse is fitted in this plug.
Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amperes and it is approved by ASTA or BSI to BS1362
Check for the ASRA mark or the BSI mark on the body of the fuse.

ASTA mark	BSI mark

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.
If you lose the fuse cover, the plug must not be used until a replacement cover is obtained.
A replacement fuse cover can be purchased from your local Panasonic Dealer.
If the fitted moulded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safety.
There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.
If a new plug is to be fitted please observe the wiring code as shown below.
If in any doubt, please consult a qualified electrician.

2.2.1. Important

The wires in this mains lead are coloured in accordance with the following code:

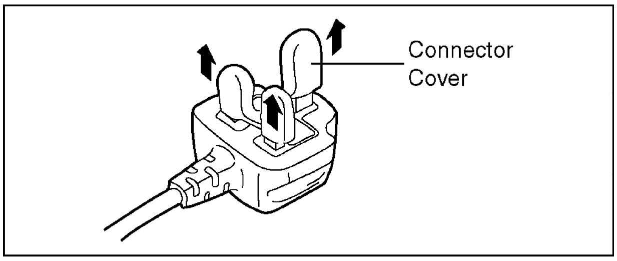
Blue	**Neutral**
Brown	**Live**

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.
Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol.

Earth Symbol	⏚

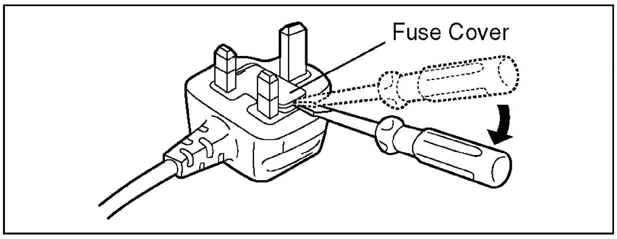
2.2.2. Before use

remove the Connector Cover as follows.

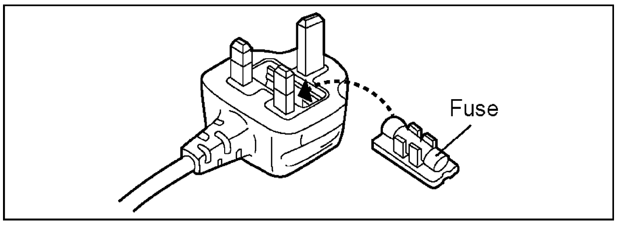


2.2.3. How to replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



2. Replace the fuse and attach the Fuse cover.



3. SERVICE CAUTION

3.1. EEPROM DATA FOR SPARE PARTS OF THE MAIN C.B.A.

When the Main C.B.A. is replaced, the fixed and average data must be changed by Tatsujin kit according to the Movie Camera's suffix.
Then, confirm and/or adjust the VTR and Camera adjustment one by one.

3.2. SERVICE EXTENSION CABLES.

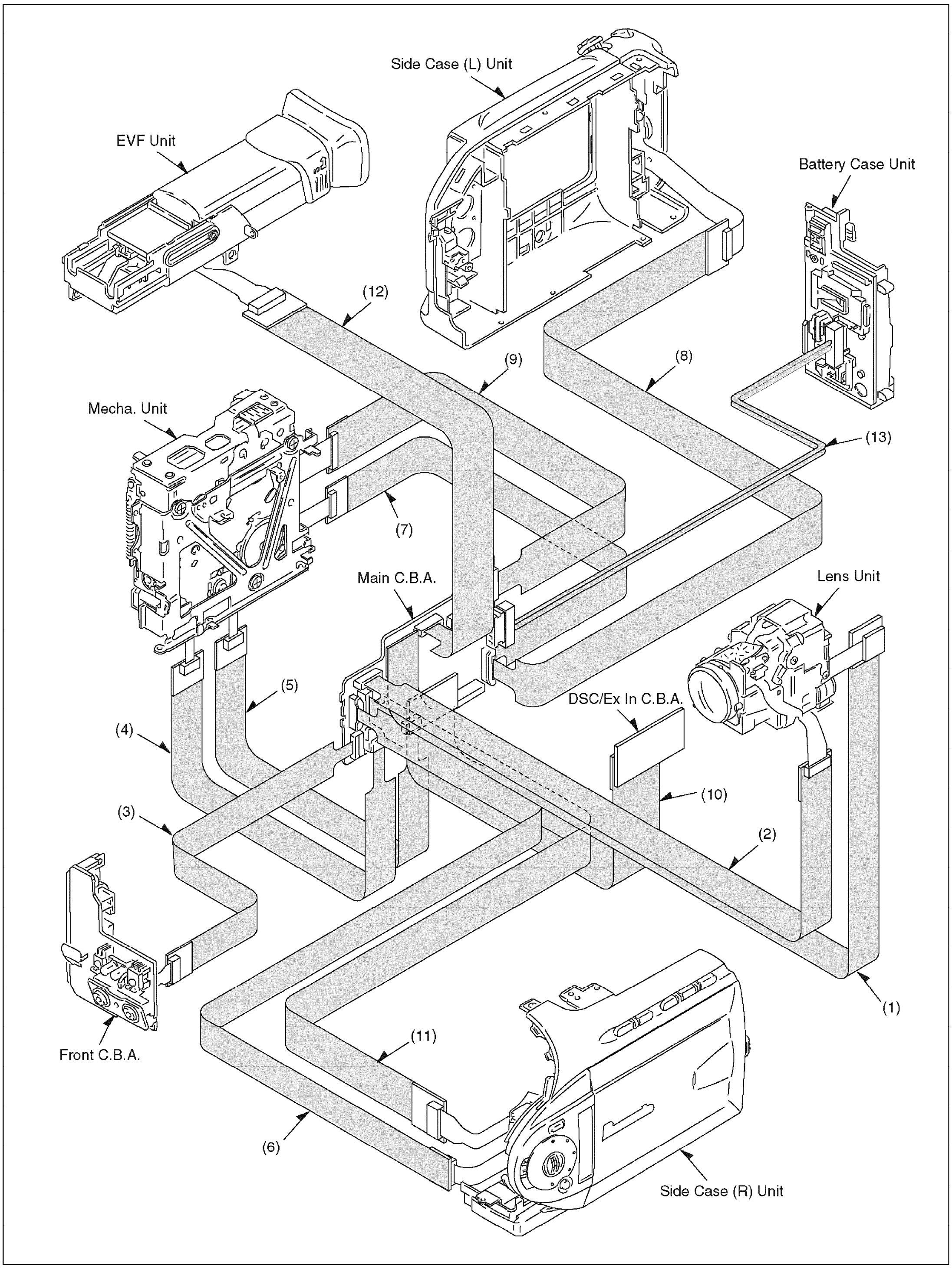
This models is required the following extension cables for all connections.

Note 1:
Use the following extension cables when checking or adjusting individual circuit boards except module Parts. (Main C.B.A.)

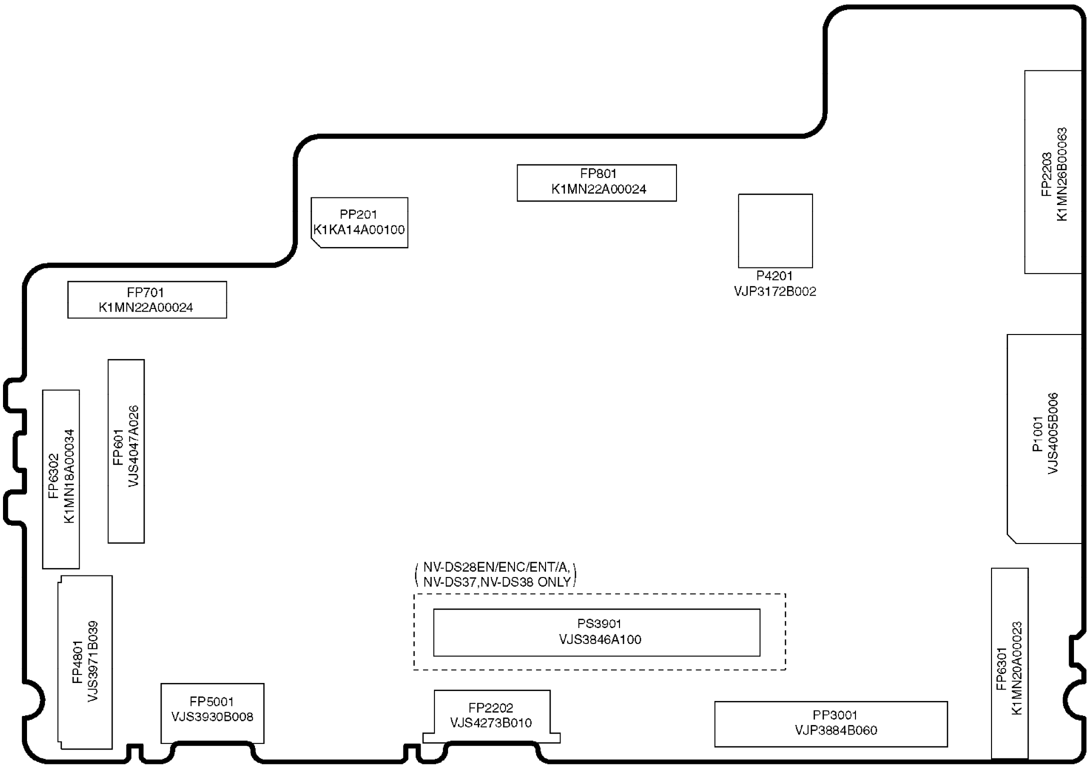
Ref.	Part No.	Pin	Part Name	Connection	Q'ty	Remarks
(1)	VFK1595D1425	14	Flat Cable	PP201(Main) - PS291 (CCD)	1	as NV-DS1
(2)	VFK1282	22	Flat Cable	FP701(Main) - Lens Flex.	1	as NV-DX
(3)	VFK1459	39	Flat Cable	FP4801(Main) - FP4903(Front)	1	as NV-DS7
(4)	VFK1441	8	Flat Cable	FP5001(Main) - Cylinder (Head Amp)	1	as NV-DS7
(5)	VFK1440	10	Flat Cable	FP2202(Main) - Cylinder (Drive)	1	as NV-DS7
(6)	VFK1443	18	Flat Cable	FP6302(Main) - Side Case R	1	as NV-DS7
(7)	VFK1443	18	Flat Cable	FP2201(Main) - Capstain (Drive)	1	as NV-DS7
(8)	VFK1461	20	Flat Cable	FP6301(Main) - Side Case L	1	as NV-DS7
(9)	VFK1492	26	Flat Cable	FP2003(Main) - Mechanism Unit	1	as NV-DS9
(10)	VFK1545	100	Flat Cable	PS3901(Main) - PP3901(DSC/EX IN)	1	as NV-DS1
(11)	VFK1492	26	Flat Cable	FP601 (Main) - Side Case R (Monitor)	1	as NV-DS9
(12)	VFK1282	22	Flat Cable	FP801 (Main) - EVF	1	as NV-DX
(13)	VFK1691	6	Wire Cable	P1001(Main) - Battery Case	1	New

How to use extension cables.

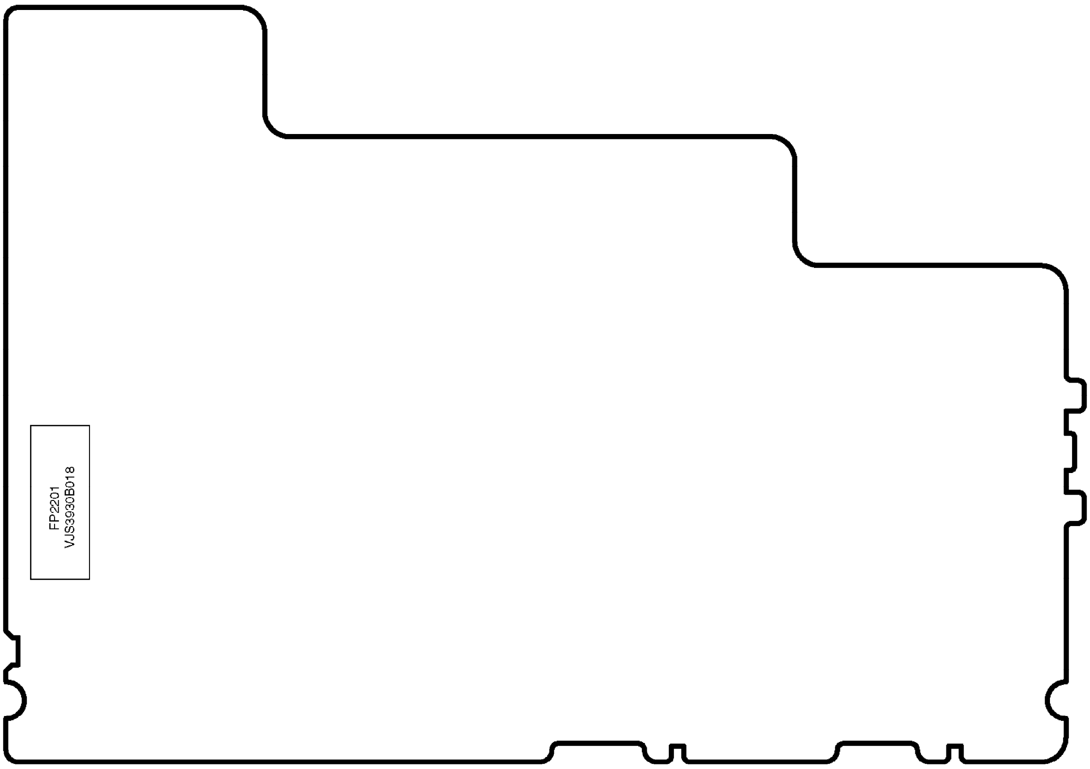
Fig. T1-1


Side Case (L) Unit
EVF Unit
Battery Case Unit
(12)
(9)
(8)
Mecha. Unit
(13)
(7)
Main C.B.A.
Lens Unit
DSC/Ex In C.B.A.
(5)
(4)
(10)
(3)
(2)
Front C.B.A.
(11)
(1)
(6)
Side Case (R) Unit

3.3. LOCATION FOR SPARE CONNECTORS OF THE MAIN C.B.A.


FP801
K1MN22A00024
PP201
K1KA14A00100
P4201
VJP3172B002
FP2203
K1MN26B00063
FP701
K1MN22A00024
FP6302
K1MN18A00034
FP601
VJS4047A026
P1001
VJS4005B006
NV-DS28EN/ENC/ENT/A,
NV-DS37,NV-DS38 ONLY
PS3901
VJS3846A100
FP4801
VJS3971B039
FP5001
VJS3930B008
FP2202
VJS4273B010
PP3001
VJP3884B060
FP6301
K1MN20A00023

(COMPONENT SIDE)


FP2201
VJS3930B018

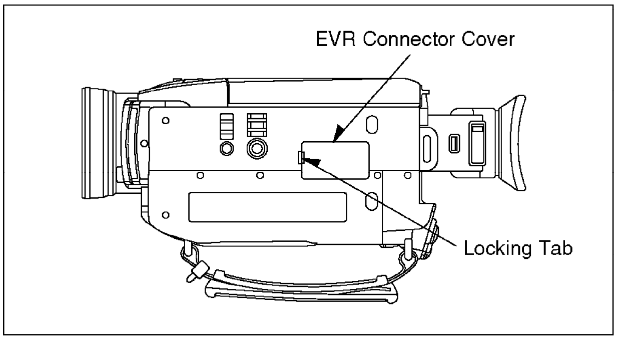
(FOIL SIDE)

4. PREPARATION FOR ELECTRICAL ADJUSTMENT

1. Unlock the locking tab and remove the EVR connector cover which is located on Battery Catcher Unit as follows.

2. Then connect the following cables as shown in Fig. E2 .

Fig. E1


EVR Connector Cover
Locking Tab

Part No.	Part Name	Q'ty	Remarks
VFK1395	232C(M3)I/F Cable	1	
VFK1308E	Measuring Board	1	
VFK1309	EVR Connector Board	1	
VFK1317	30 Pin Flat Cable	2	
VJA0941	DC Output Cable	1	For AC Adaptor
VFK1164TAR3A	Setup Ring	1	For Collimator
VFK1309EX	Connection Adaptor	1	

Fig. E2

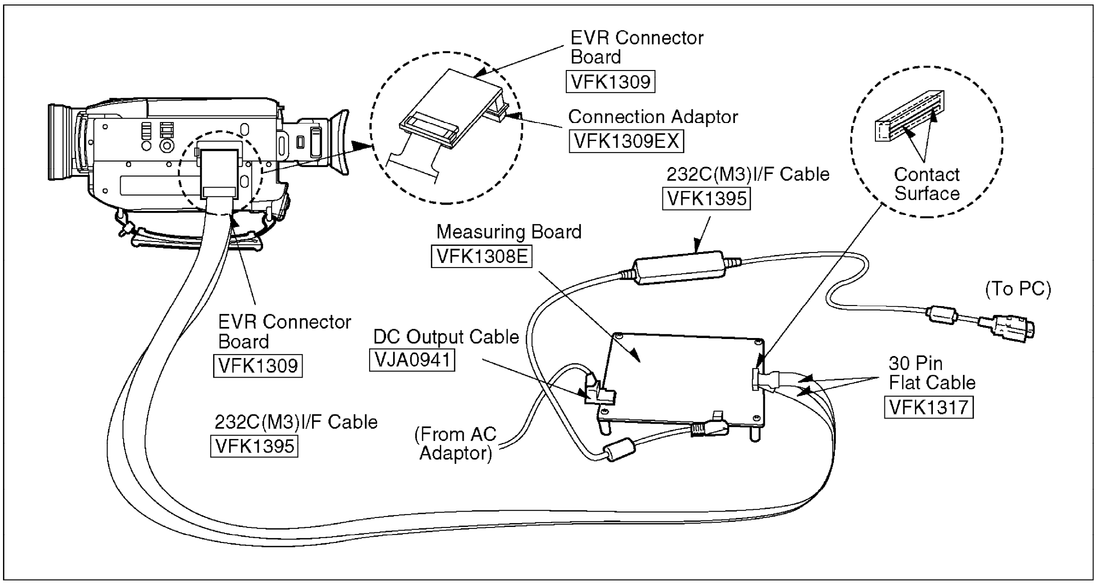
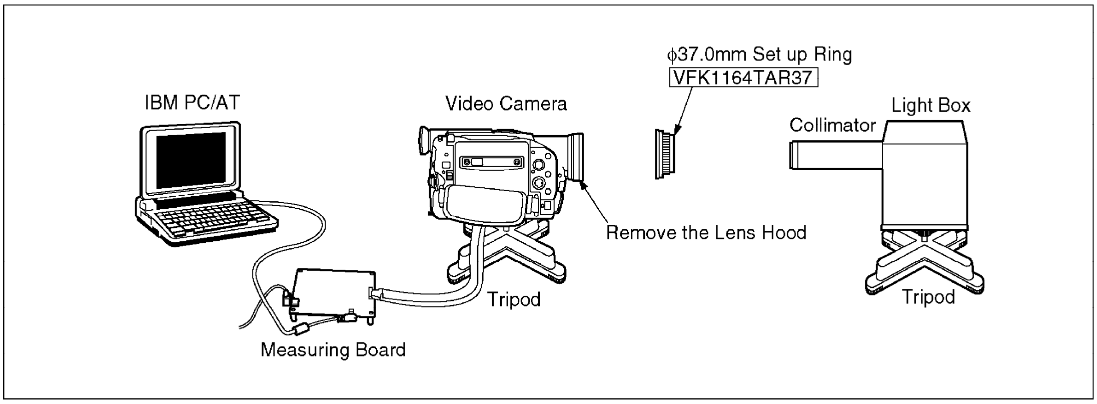

EVR Connector Board
VFK1309
Connection Adaptor
VFK1309EX
232C(M3)I/F Cable
VFK1395
Contact Surface
Measuring Board
VFK1308E
(To PC)
EVR Connector Board
VFK1309
DC Output Cable
VJA0941
30 Pin Flat Cable
VFK1317
232C(M3)I/F Cable
VFK1395
(From AC Adaptor)

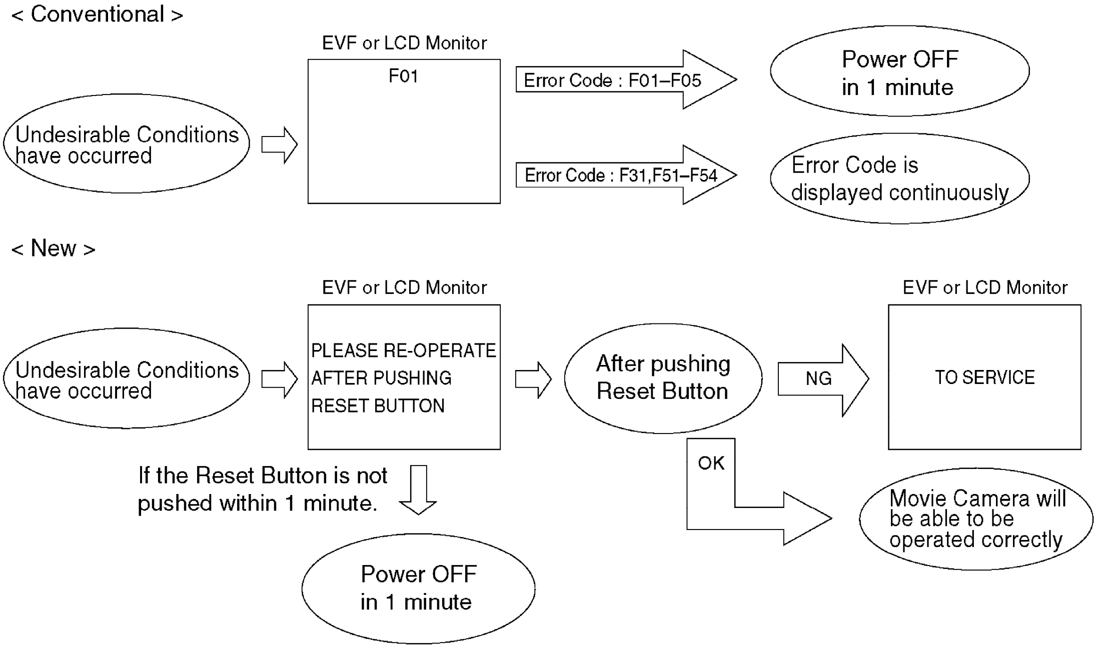
Fig. E3


φ37.0mm Set up Ring
VFK1164TAR37
IBM PC/AT
Video Camera
Light Box
Collimator
Remove the Lens Hood
Tripod
Tripod
Measuring Board

5. SERVICE MODE

5.1. New Error Code Display

Conventionally, the error code has been displayed automatically on the EVF or LCD Monitor when undesirable conditions have occurred. With the New Error Code Display, the error code has not been displayed automatically as follows except some error codesF31(Data Transmission Error), U10(Dew) and U11(Head Clogging).


< Conventional >
EVF or LCD Monitor
F01
Undesirable Conditions have occurred
Error Code : F01–F05
Power OFF in 1 minute
Error Code : F31,F51–F54
Error Code is displayed continuously
< New >
EVF or LCD Monitor
Undesirable Conditions have occurred
PLEASE RE-OPERATE AFTER PUSHING RESET BUTTON
After pushing Reset Button
NG
EVF or LCD Monitor
TO SERVICE
OK
Movie Camera will be able to be operated correctly
If the Reset Button is not pushed within 1 minute.
Power OFF in 1 minute

Note:

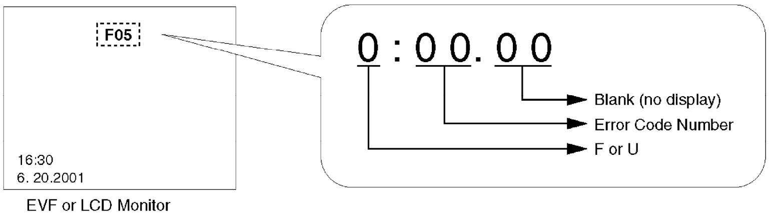
1. **The only some error codes F31, U10 and U11 has displayed automatically on the EVF or LCD monitor as usual.**
2. **The Power LED also has been flashed for 1 min. when undesirable condetions have occurred.(See below)**

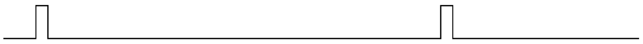
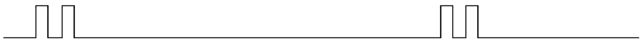
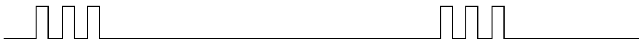
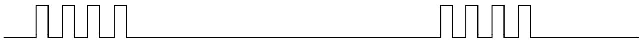
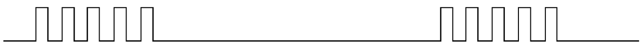
5.2. Viewing Error Code

When displaying the Error Code on the EVF or LCD Monitor, push the FADE/STOP and REC START/ PAUSE buttons simultaneously for more 3 seconds.

Note:

When the cassette tape is inserted, this operation will not be worked.



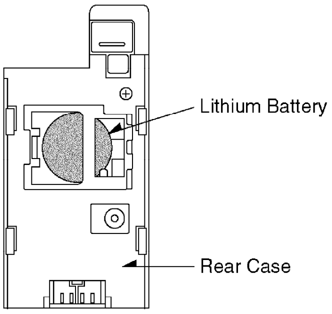
DISPLAY	CONDITION	POWER OFF TIMING / POWER LED FLASHING TIMING
F01	T-Reel Lock	After 1 minute flashing the LED 
F02	S-Reel Lock	After 1 minute flashing the LED 
F03	Unloading Lock	After 1 minute flashing the LED 
F04	Loading Lock	After 1 minute flashing the LED 
F05	Cylinder Lock	After 1 minute flashing the LED 
F31	Data Transmission Error	Not turning OFF
F51	Focus Motor Lock	Not turnig OFF Power LED is flashed at 1 Hz timing
F52	Zoom Motor Lock	Not turnig OFF Power LED is flashed at 1 Hz timing
U10	Dew Detection	After 18 seconds flashing the LED Power LED is flashed at 1 Hz timing
U11	Head Clogging	Not turning OFF

6. HOW TO REPLACE THE LITHIUM BATTERY (PROCEDURE)

1. Remove the Power Flex. from Rear Case Unit. (Refer to Disassembly Procedures.)

2. Unsolder the Lithium Battery “ML920S” and then replace the new one. (See Fig. B1 .)

Fig. B1



Note:
The lithium battery is a critical component. (Type No.: CR2025 Manufactured by Panasonic.)
It must never be subjected to excessive heat or discharge.
It must therefore only be fitted in equipment designed specifically for its use.
Replacement batteries must be of the same type and manufacture.
They must be fitted in the same manner and location as the original battery, with the correct polarity contacts observed.

Do not attempt to re-charge the old battery or re-use it for any other purpose.
It should be disposed of in waste products destined for burial rather than incineration.

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the equipment manufacturer.
Discard used batteries according to manufacturer's instructions.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

7. OPERATING GUIDE

8. ADJUSTMENT PROCEDURES

8.1. DISASSEMBLE FLOW CHART

This flow chart indicates the disassembly steps the cabinet parts, C.B.A. and Mecha. Unit in order to access to be serviced. When reinstalling, perform the steps in the reverse order.

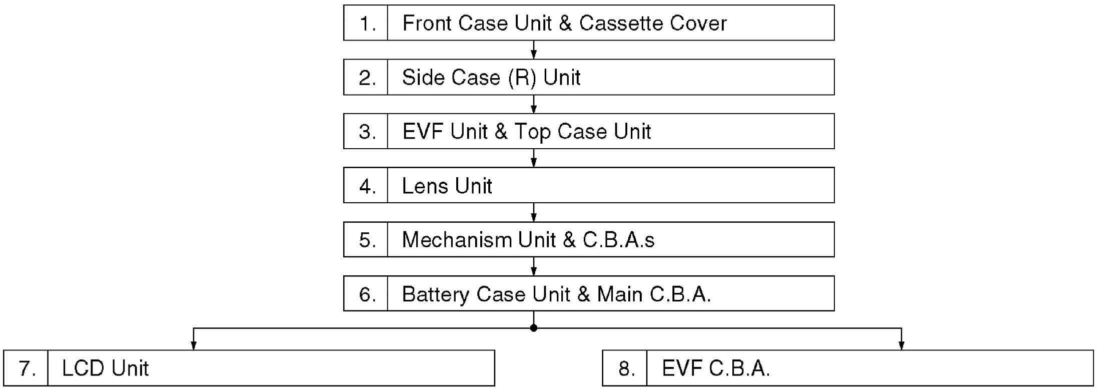
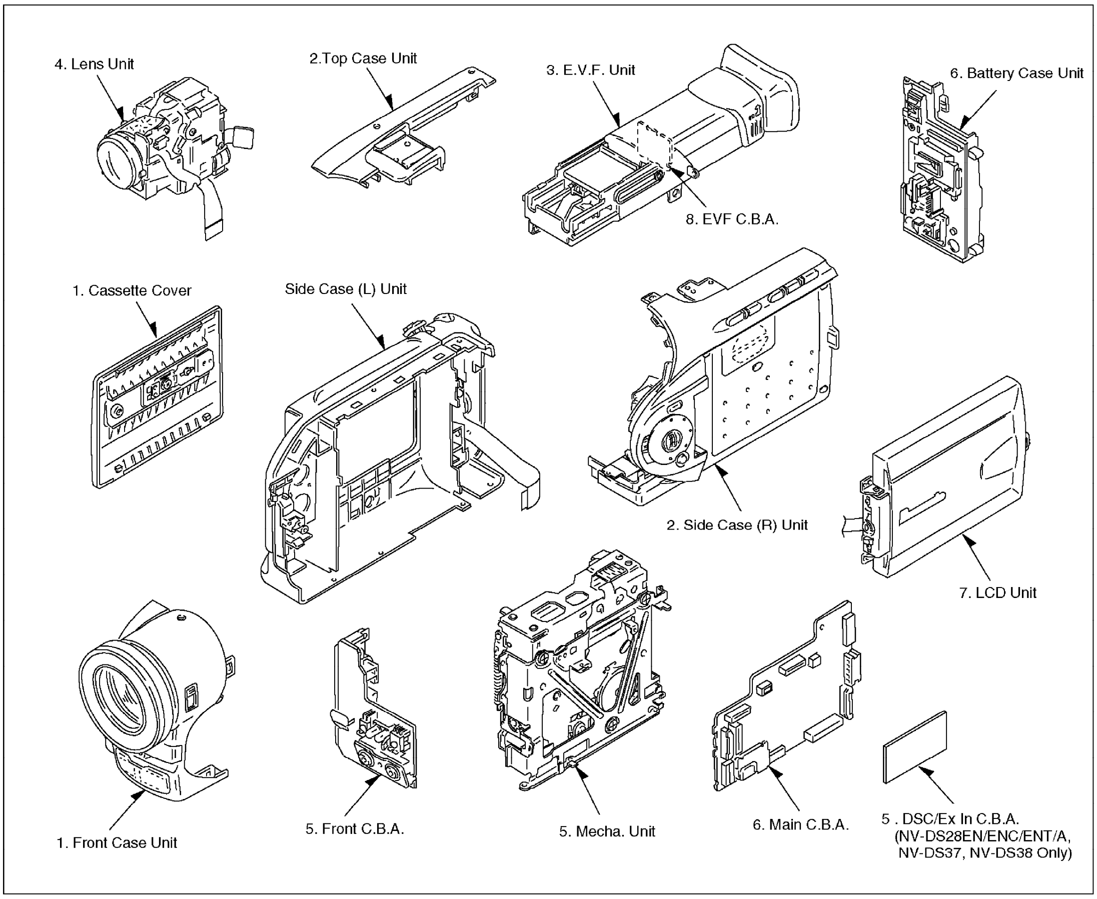

1. Front Case Unit & Cassette Cover
2. Side Case (R) Unit
3. EVF Unit & Top Case Unit
4. Lens Unit
5. Mechanism Unit & C.B.A.s
6. Battery Case Unit & Main C.B.A.
7. LCD Unit
8. EVF C.B.A.

Fig. F1


4. Lens Unit
2.Top Case Unit
3. E.V.F. Unit
6. Battery Case Unit
8. EVF C.B.A.
1. Cassette Cover
Side Case (L) Unit
2. Side Case (R) Unit
7. LCD Unit
1. Front Case Unit
5. Front C.B.A.
5. Mecha. Unit
6. Main C.B.A.
5 . DSC/Ex In C.B.A. (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38 Only)

8.2. DISASSEMBLY PROCEDURES

Flow-Chart for Disassembly Procedure

No.	Item/Part	Fig.	Removal (Screw & Other)
1.	**Front Case Unit & Cassette Cover**	**Fig. 1**	**6-Screws(A/B/C)**
		Fig. 2	**5-Screws(D/E/F)**
		Fig. 3	**6-Screw(G/H/I)** **Remove Cassette Cover**
		Fig. 4	**Unlock---(a)** **Remove the Front Case Unit.**
2.	**Side Case (R) Unit**	**Fig. 5**	**5-Screws(J/K/L)**
		Fig. 6	**Slide the Side Case (R) Unit.** **Disconnect the following connectors.** **FP601/FP6302/P4201/ FP3902** **Remove the Side Case (R) Unit.**
3.	**EVF Unit & Top Case Unit**	**Fig. 7**	**1-Screw(M)Disconnect the FP801.** **Remove the EVF Unit.** **Remove the Top Case Unit.**

No.	Item/Part	Fig.	Removal (Screw & Other)
4.	Lens Unit	Fig. 7	1-Screw(N) Disconnect the FP701/ PP201. Remove the Lens Unit.
5.	Mecha. Unit & Main/ Front/ DSC Ex In (NV-DS28EN/ ENC/ENT/A, DS37, NV-DS38only) C.B.A.s.	Fig. 8	Disconnect the FP4801/ FP6301. Remove the Mecha. Unit & Main C.B.A.. Disconnect the PS3901.Remove the DSC Ex In C.B.A.. Unlock---(b) Remove the Front C.B.A..
6.	Rear Case Unit & Main C.B.A.	Fig. 9	Remove the Battery Case Unit(Disconnect P1001) 1-Screw(O) Disconnect the following connectors. FP5001/FP2203/FP2201/ FP2202 Unlock---(c) Remove the MainC.B.A..
7.	LCD Unit	Fig. 10	2-Screws(P) Unlock---(d) Remove the LCD Case (Upper). Disconnect the FP903. Unlock---(e) Remove the LCD Unit from Side Case (R) Unit.
		Fig. 11	Remove the Back Light Unit,Insulation Sheet and Monitor C.B.A..
8.	EVF C.B.A.	Fig. 12	Remove the EVF Flex. 2-Screws(Q) Remove the EVF Unit.
		Fig. 13	Unlock---(f) Remove the Eye Cap Holder and Eye Cap.
		Fig. 14	Unlock---(g) Remove the EVF Case (Upper) and (Lower).

Fig. 1

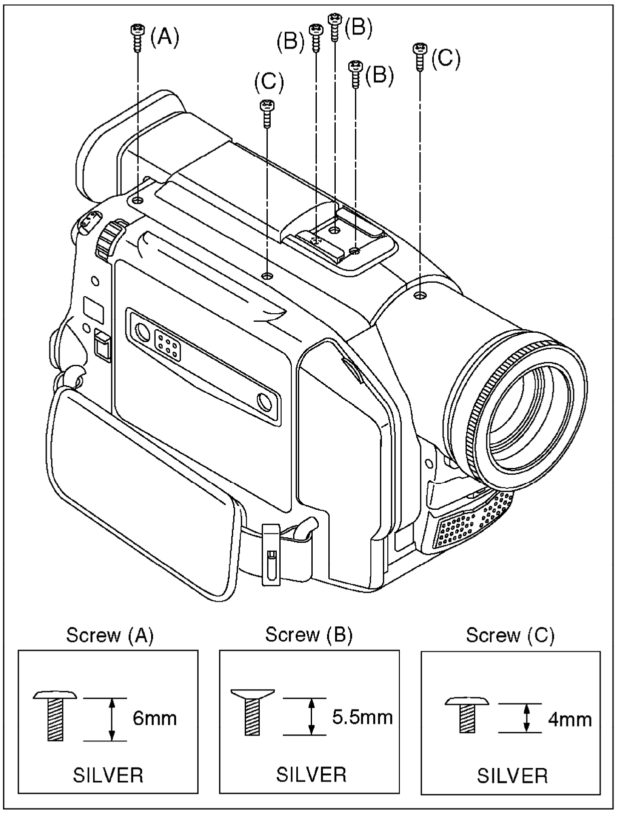

(A)
(B)
(B)
(B)
(C)
(C)
Screw (A)
6mm
SILVER
Screw (B)
5.5mm
SILVER
Screw (C)
4mm
SILVER

Fig. 2

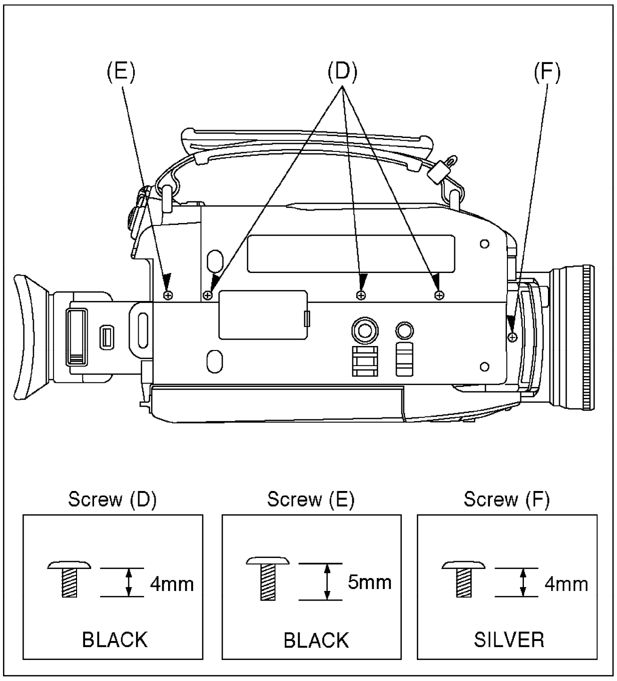

(E)
(D)
(F)
Screw (D)
4mm
BLACK
Screw (E)
5mm
BLACK
Screw (F)
4mm
SILVER

Fig.3

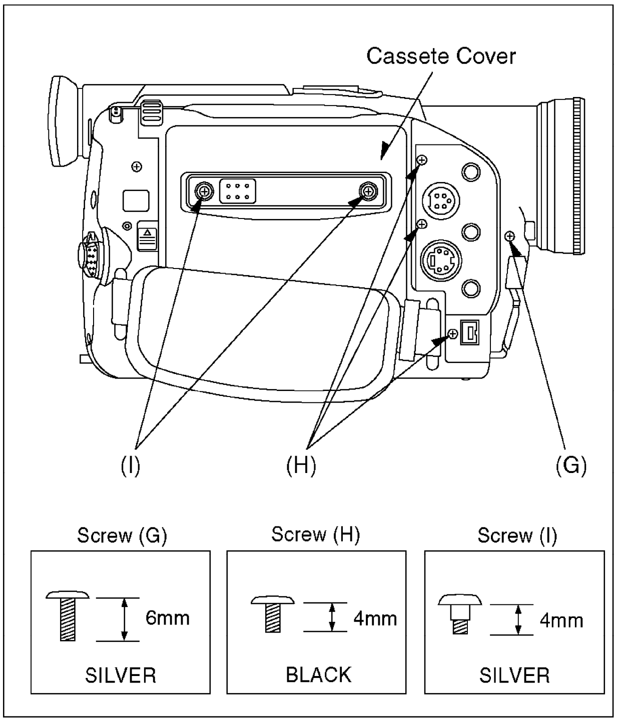

Cassete Cover
(I)
(H)
(G)
Screw (G)
6mm
SILVER
Screw (H)
4mm
BLACK
Screw (I)
4mm
SILVER

Fig.4

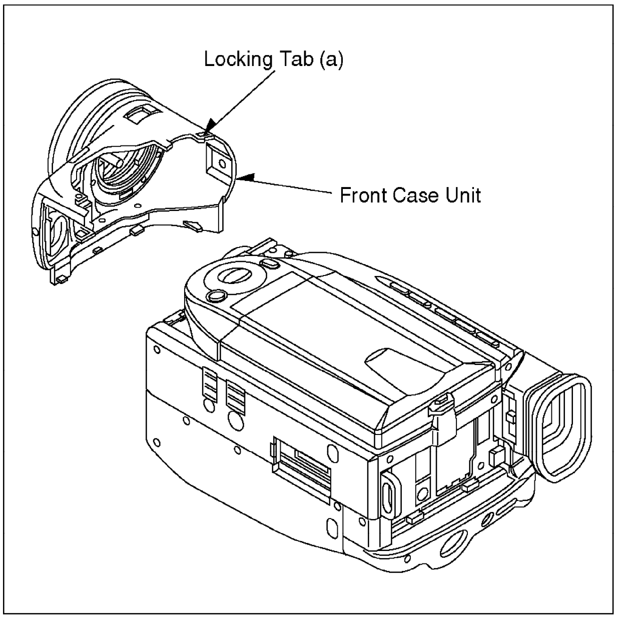

Locking Tab (a)
Front Case Unit

Fig. 5

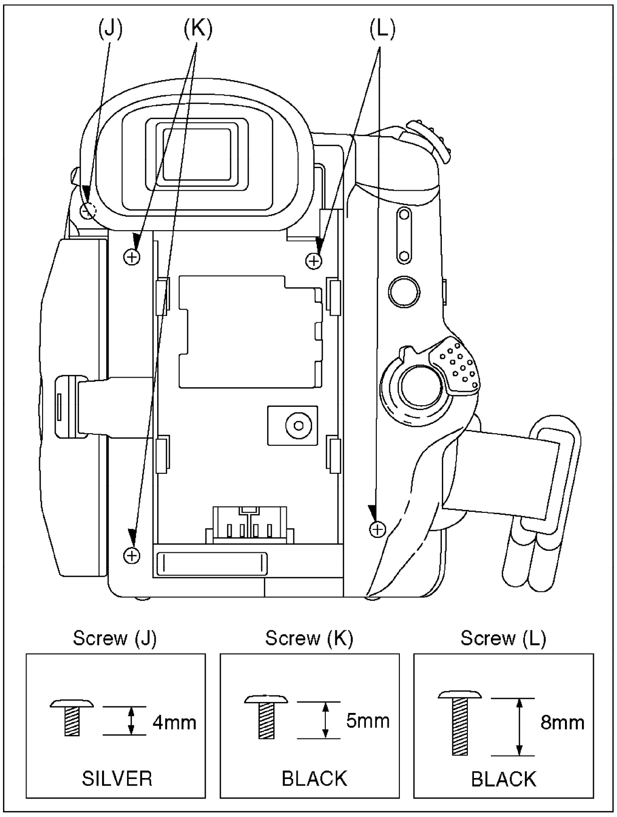

(J)
(K)
(L)
Screw (J)
4mm
SILVER
Screw (K)
5mm
BLACK
Screw (L)
8mm
BLACK

Fig. 6

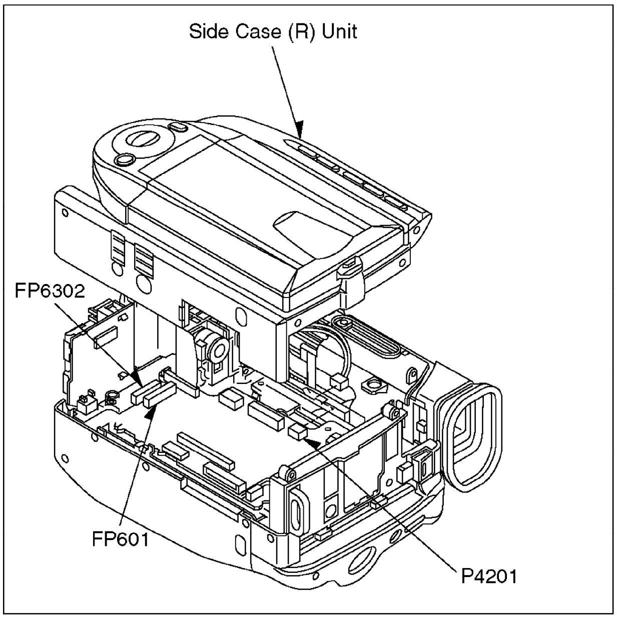

Side Case (R) Unit
FP6302
FP601
P4201

Fig. 7

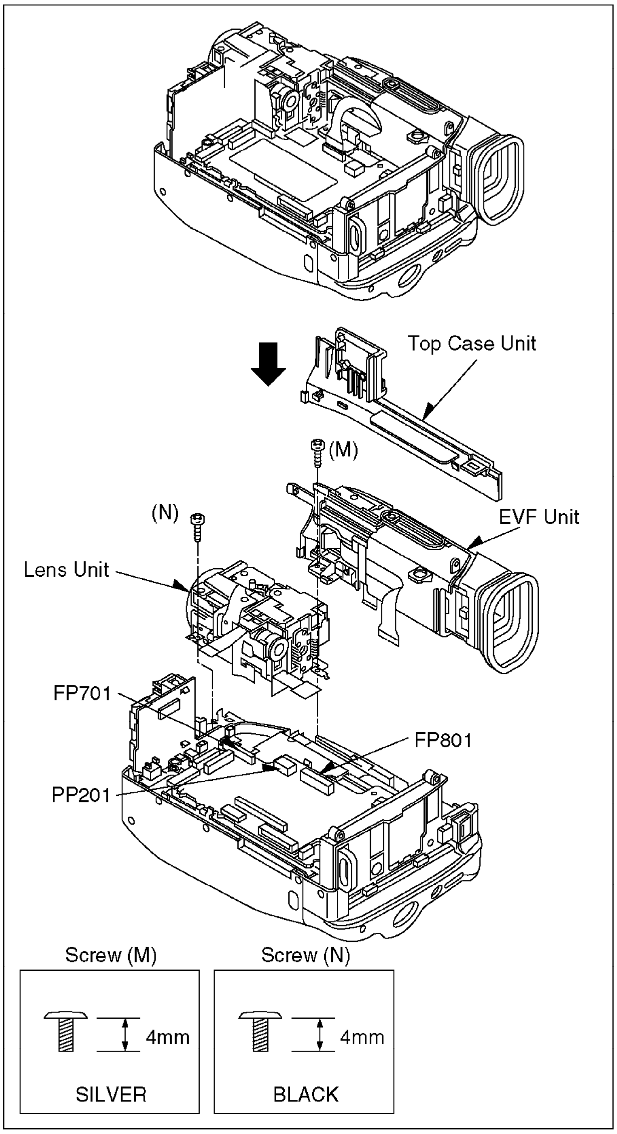

Top Case Unit
(M)
EVF Unit
(N)
Lens Unit
FP701
FP801
PP201
Screw (M)
4mm
SILVER
Screw (N)
4mm
BLACK

Fig. 8

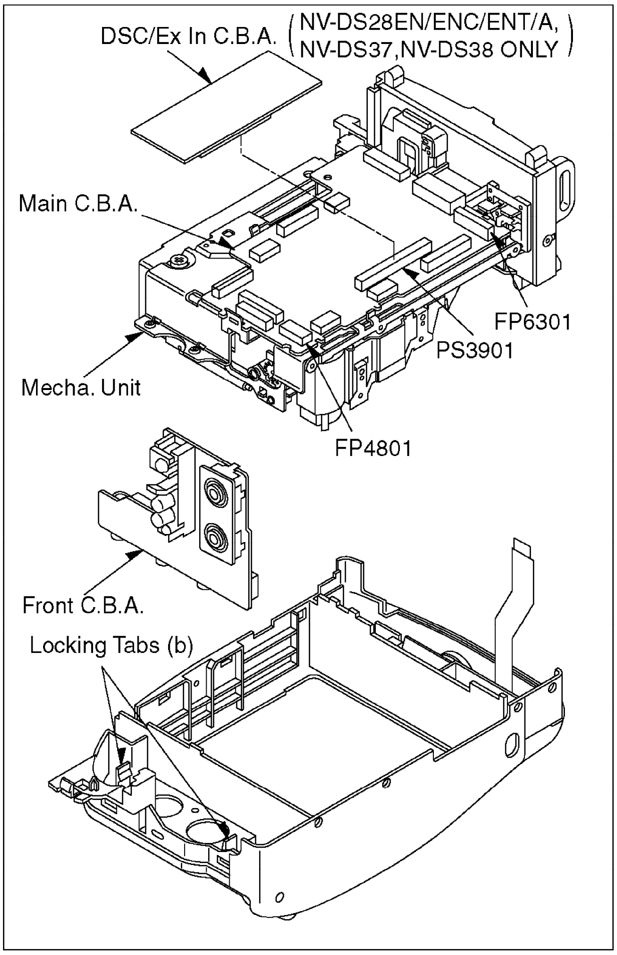

DSC/Ex In C.B.A. (NV-DS28EN/ENC/ENT/A, NV-DS37,NV-DS38 ONLY)
Main C.B.A.
FP6301
PS3901
Mecha. Unit
FP4801
Front C.B.A.
Locking Tabs (b)

Fig. 9

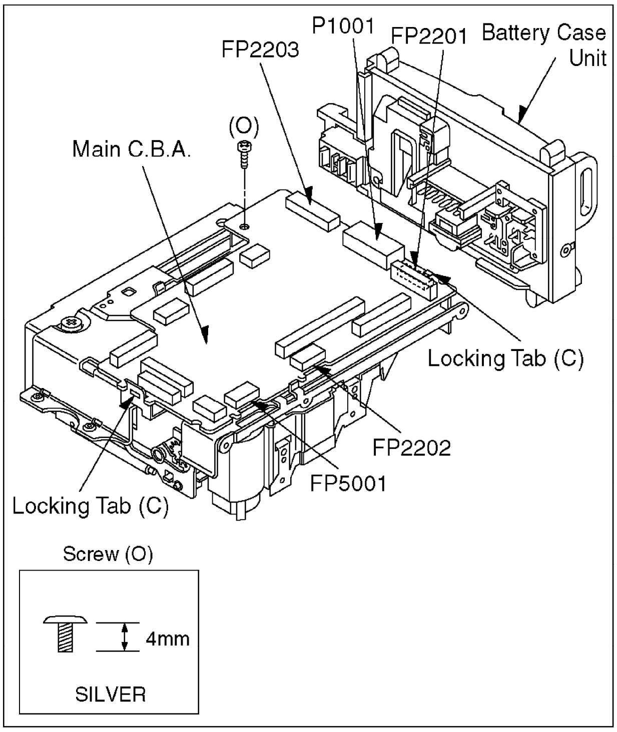

P1001
FP2203
FP2201
Battery Case Unit
(O)
Main C.B.A.
Locking Tab (C)
FP2202
FP5001
Locking Tab (C)
Screw (O)
4mm
SILVER

Fig. 10

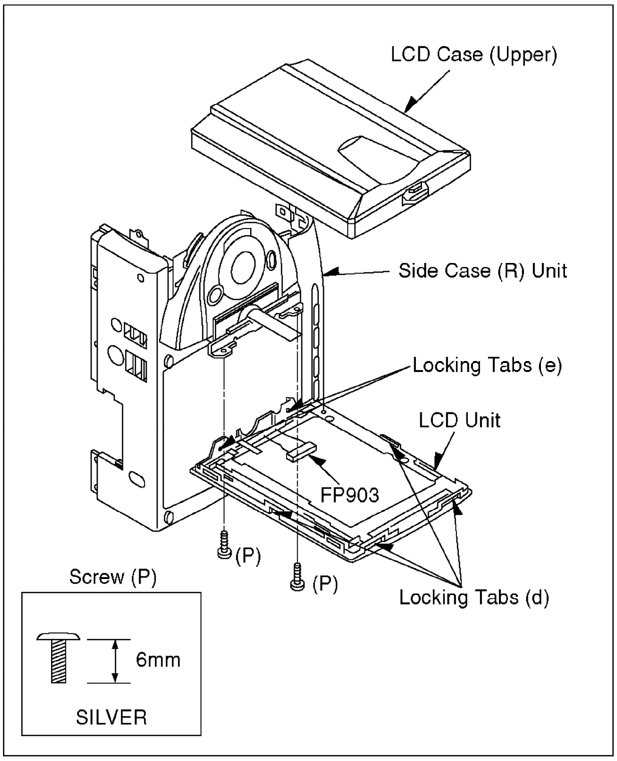

LCD Case (Upper)
Side Case (R) Unit
Locking Tabs (e)
LCD Unit
FP903
(P)
(P)
Screw (P)
Locking Tabs (d)
6mm
SILVER

Fig. 11

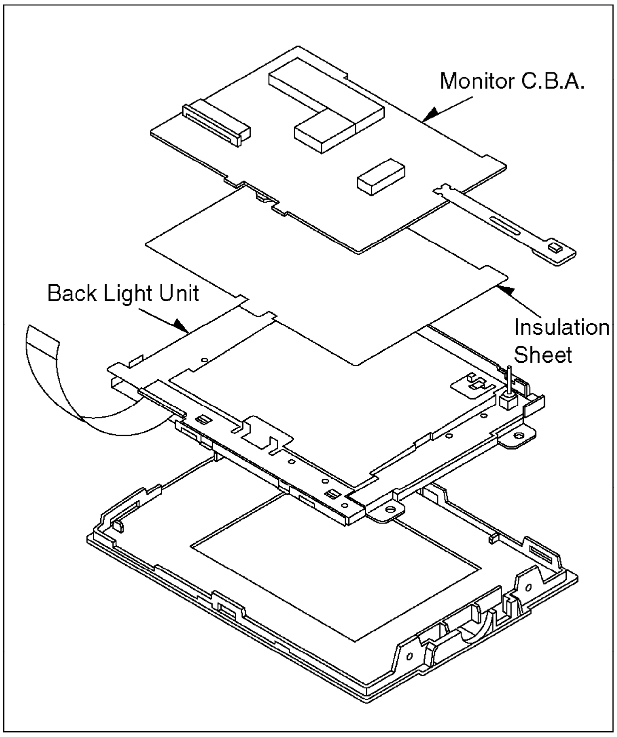

Monitor C.B.A.
Back Light Unit
Insulation Sheet

Fig. 12

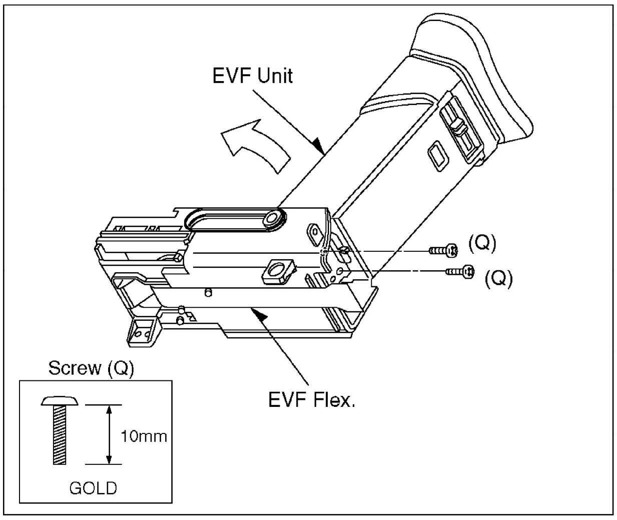

EVF Unit
(Q)
(Q)
Screw (Q)
10mm
GOLD
EVF Flex.

Fig. 13

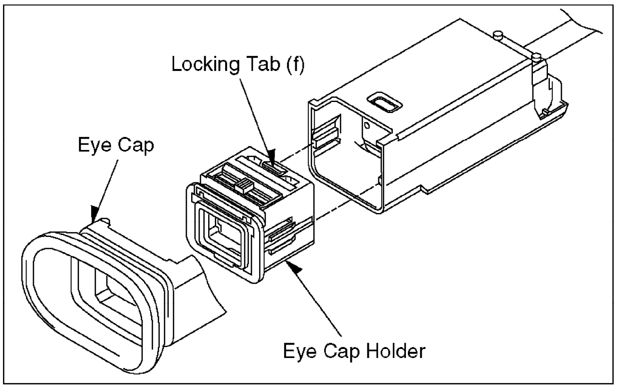
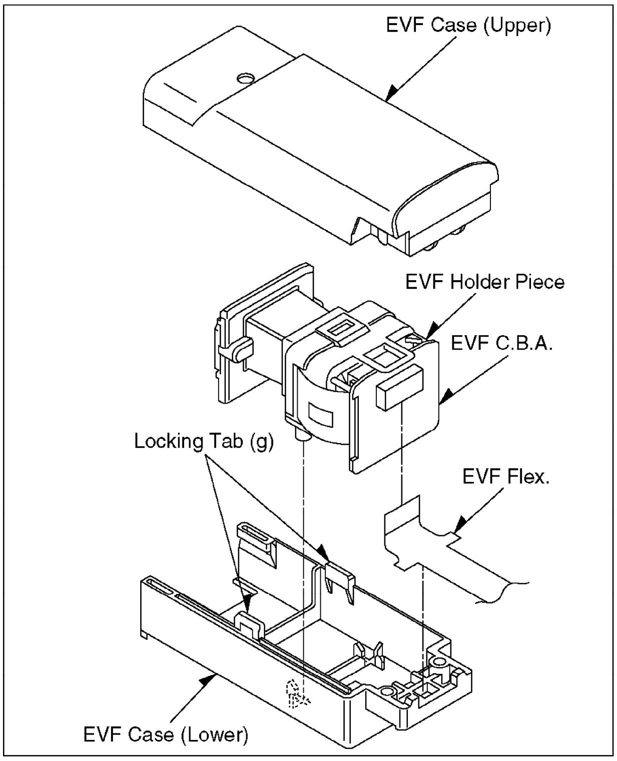

Locking Tab (f)
Eye Cap
Eye Cap Holder

Fig. 14


EVF Case (Upper)
EVF Holder Piece
EVF C.B.A.
Locking Tab (g)
EVF Flex.
EVF Case (Lower)

8.3. DISASSEMBLY PROCEDURES OF CAMERA LENS UNIT

The following flowchart describes order or steps for removing the Camera lens unit and certain

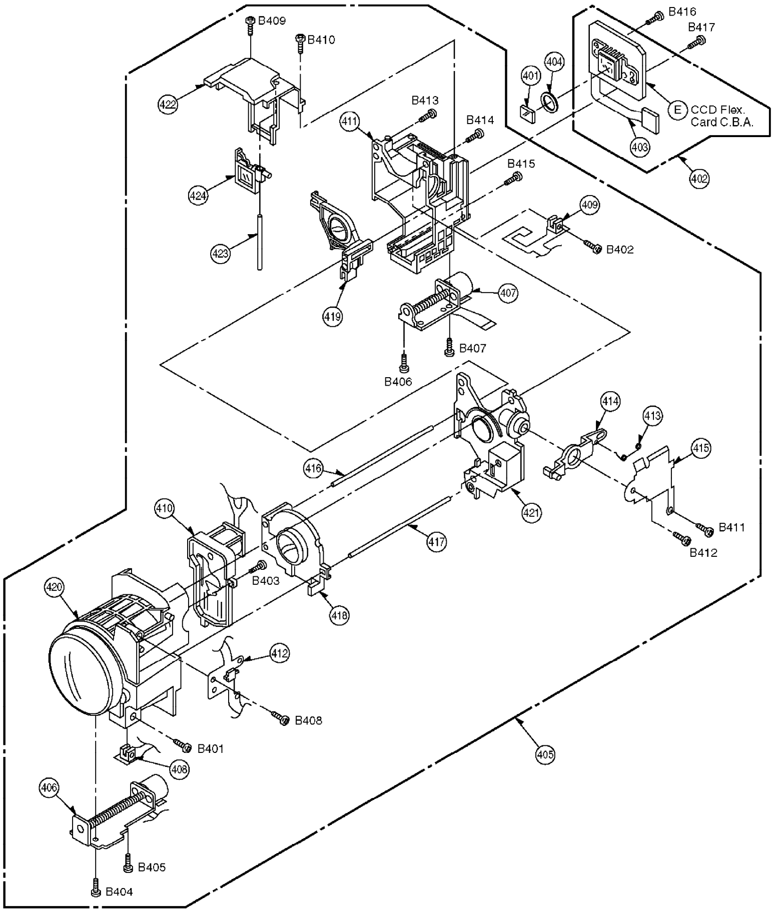
printed circuit boards in order to make access to the item needing service. / To reassemble the unit follow the steps in reverse order.

Fig. L1

1. CCD Unit	Ref.-No.402
2. CCD Cushion & Crystal Filter	Ref.-No.404/401
3. Protect Sheet & Lever	Ref.-No.415/414
4. F Fix frame & F Frame Unit	Ref.-No.422/424
5. Zoom Motor Unit	Ref.-No.406
6. Focus Motor Unit	Ref.-No.407
7. Lens Flex. Unit	Ref.-No.412
8. Master Flange & Iris Unit	Ref.-No.411/410
9. 3rd Lens Frame Unit	Ref.-No.421
10. 4TH Moving Frame Unit	Ref.-No.419
11. 2nd Moving Frame Unit	Ref.-No.418
12. Guide Pole	Ref.-No.416/417

Note 1:
Each Ref-numbers are equivalent to number of Fig.L1 and Parts List.

Fig. L2



B409
B410
B416
B417
422
B413
411
B414
401
404
E
CCD Flex. Card C.B.A.
403
402
B415
424
409
B402
423
419
407
B407
B406
414
413
415
416
410
421
417
B411
B412
420
B403
418
412
B408
B401
408
405
406
B405
B404

9. ABBREVIATIONS

10. WAVEFORM TABLE

11. SCHEMATIC DIAGRAMS

11.1. OVERALL SCHEMATIC DIAGRAM

11.2. INTERCONNECTION SCHEMATIC DIAGRAM

11.3. CCD FLEX. CARD SCHEMATIC DIAGRAM

11.4. SIDE CASE L UNIT SCHEMATIC DIAGRAM

11.5. SUDE CASE R UNIT (CAM/VTR OPERATION FLEX.) SCHEMATIC DIAGRAM

11.6. SIDE CASE R UNIT (DSC FLEX.) SCHEMATIC DIAGRAM (NV-DS37, NV-DS38 ONLY)

11.7. FRONT SCHEMATIC DIAGRAM

11.8. MONITOR & HALL SENSOR SCHEMATIC DIAGRAM

11.9. EVF SCHEMATIC DIAGRAM

12. CIRCUIT BOARD ASSEMBLIES

12.1. MONITOR C.B.A.

12.1.1. MONITOR ADDRESS INFORMATION

12.2. CCD FLEX. CARD C.B.A.

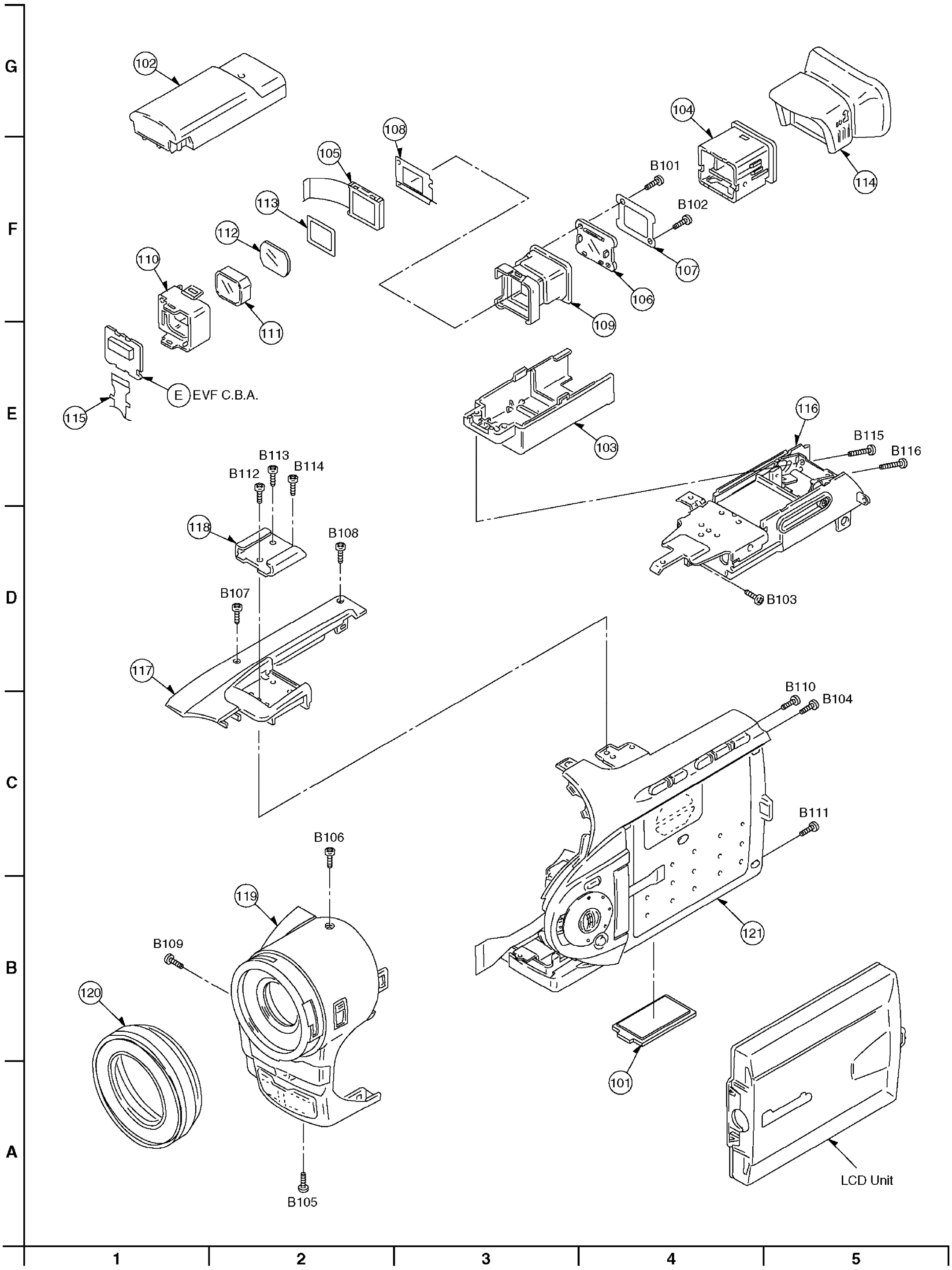
12.3. FRONT C.B.A.

12.3.1. FRONT ADDRESS INFORMATION

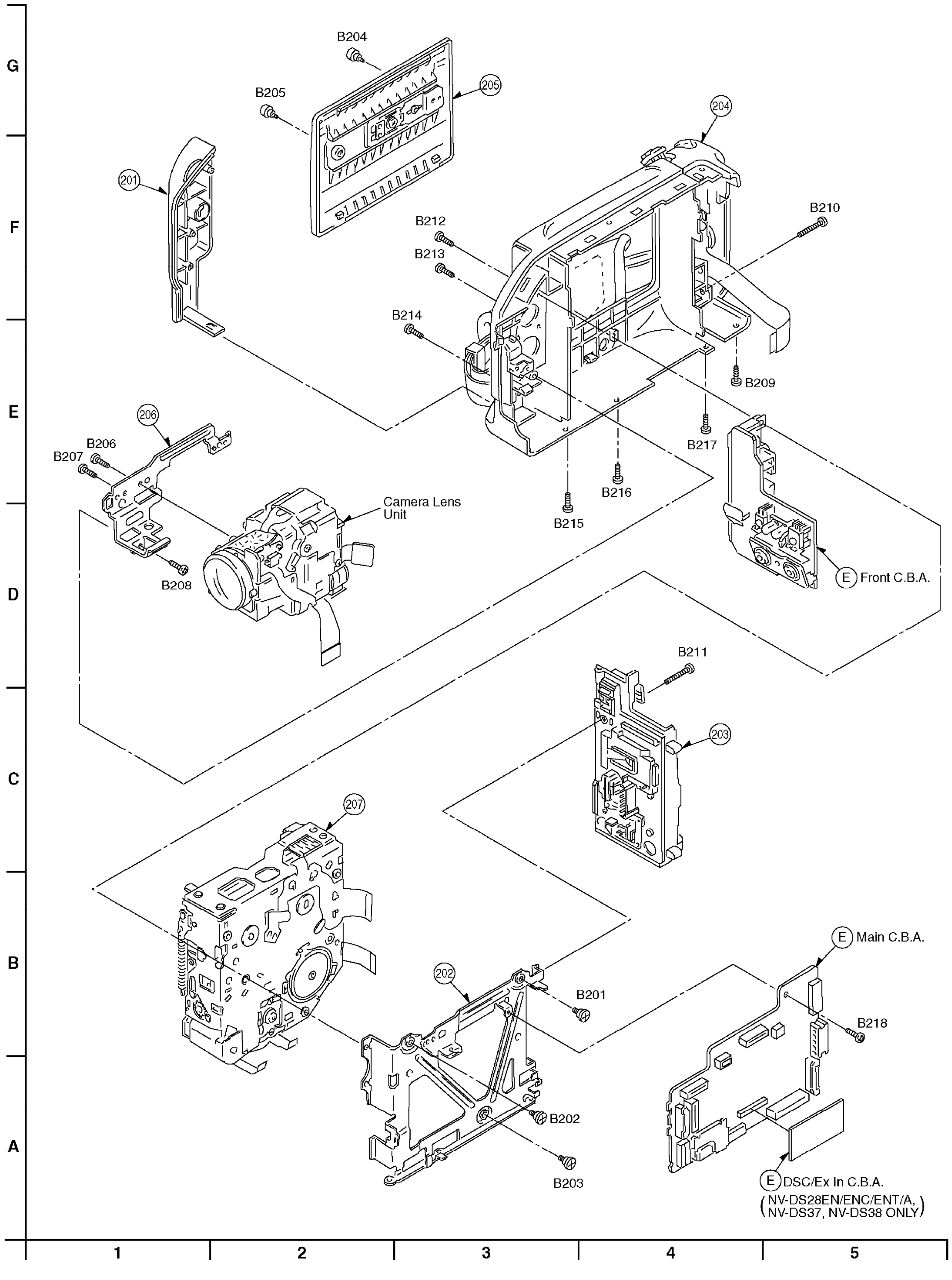
12.3.2. EVF C.B.A.

13. EXPLODED VIEWS

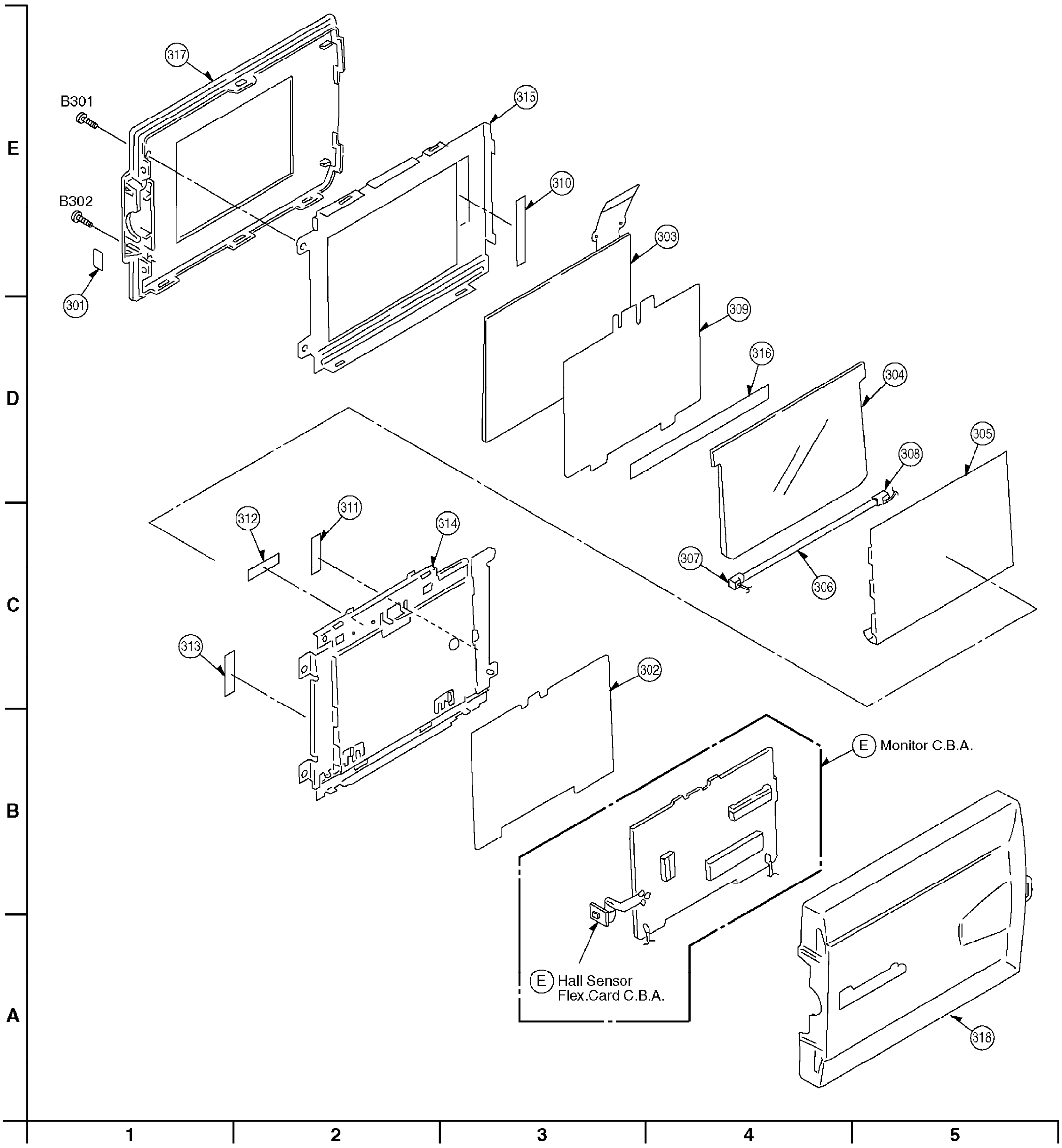
13.1. FRAME & CASING SECTION (1)


G
F
E
D
C
B
A
1
2
3
4
5
102
108
105
104
114
B101
B102
113
112
110
111
107
106
109
E EVF C.B.A.
115
103
116
B115
B116
B113
B112
B114
118
B108
B107
B103
117
B110
B104
B111
B106
119
121
B109
120
101
LCD Unit
B105

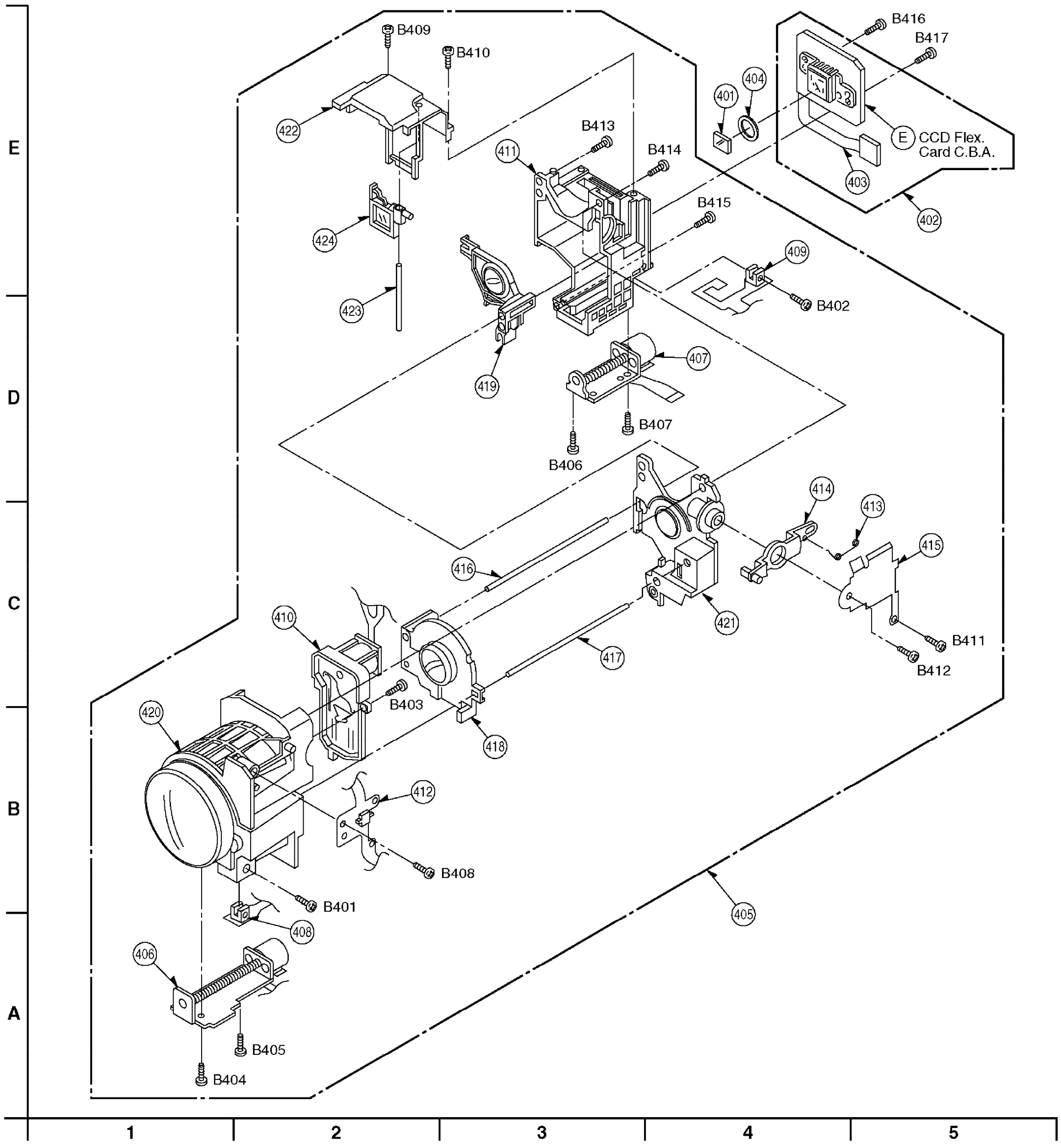
13.2. FRAME & CASING SECTION (2)


G
F
E
D
C
B
A
1
2
3
4
5
B204
B205
205
204
201
B212
B213
B210
B214
B209
206
B206
B207
Camera Lens Unit
B217
B216
B215
B208
E Front C.B.A.
B211
203
207
E Main C.B.A.
202
B201
B218
B202
B203
E DSC/Ex In C.B.A.
(NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38 ONLY)

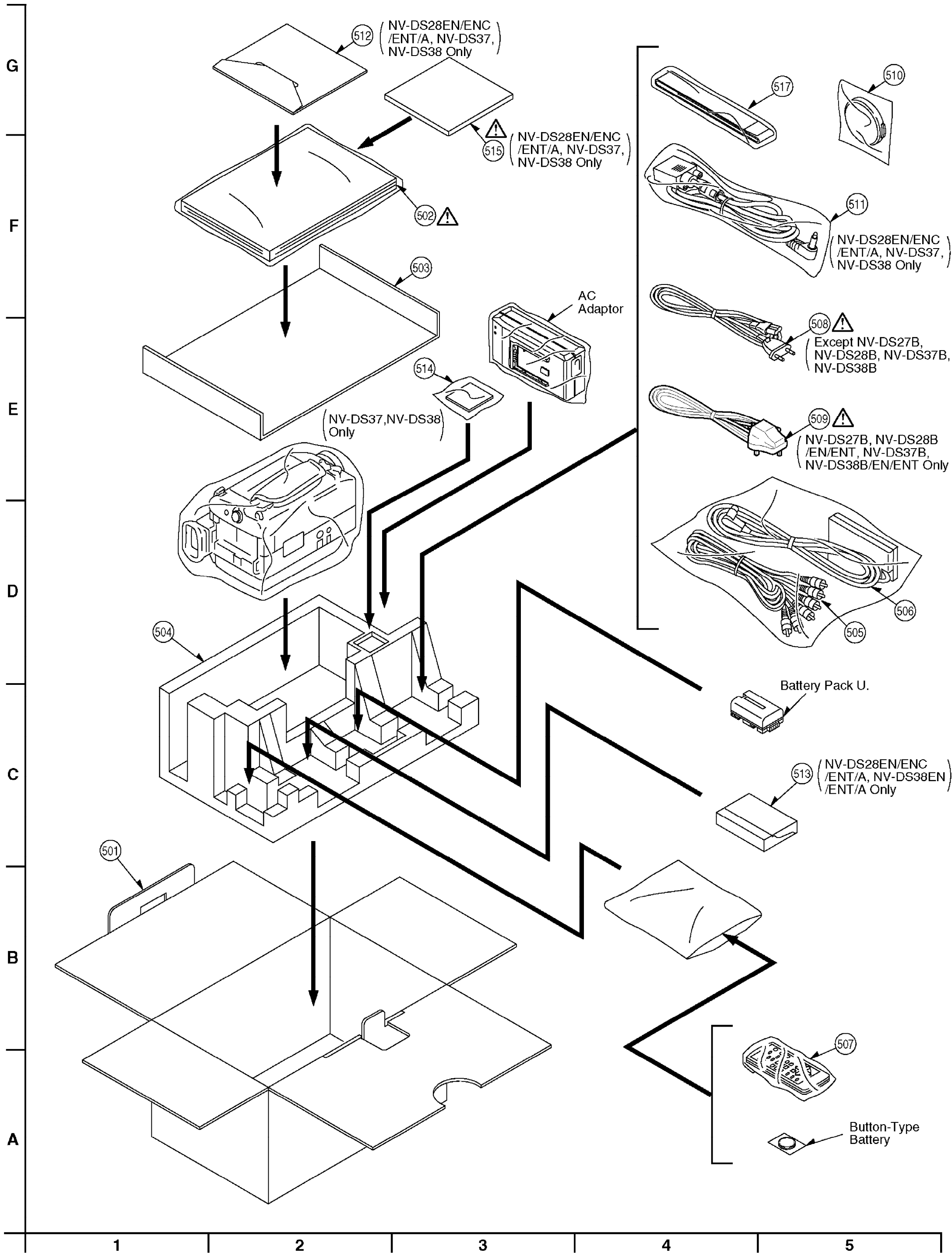
13.3. LCD SECTION


317
B301
315
E
B302
310
303
301
309
316
D
304
305
308
312
311
314
307
C
306
313
302
E Monitor C.B.A.
B
E Hall Sensor Flex.Card C.B.A.
A
318
1
2
3
4
5

13.4. CAMERA LENS SECTION


B409
B410
422
B413
411
B414
424
B415
423
419
B416
B417
401
404
E
CCD Flex.
Card C.B.A.
403
402
409
B402
407
B407
B406
414
413
415
416
410
421
417
B411
B412
B403
418
420
412
B408
B401
408
405
406
B405
B404
E
D
C
B
A
1
2
3
4
5

13.5. PACKING PARTS & ACCESSORIES SECTION



G
F
E
D
C
B
A
1
2
3
4
5
512
NV-DS28EN/ENC /ENT/A, NV-DS37, NV-DS38 Only
515
NV-DS28EN/ENC /ENT/A, NV-DS37, NV-DS38 Only
502
503
AC Adaptor
514
NV-DS37,NV-DS38 Only
504
501
517
510
511
NV-DS28EN/ENC /ENT/A, NV-DS37, NV-DS38 Only
508
Except NV-DS27B, NV-DS28B, NV-DS37B, NV-DS38B
509
NV-DS27B, NV-DS28B /EN/ENT, NV-DS37B, NV-DS38B/EN/ENT Only
506
505
Battery Pack U.
513
NV-DS28EN/ENC /ENT/A, NV-DS38EN /ENT/A Only
507
Button-Type Battery

14. REPLACEMENT PARTS LIST

14.1. FRAME & CASING SECTION (1) PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
101	VKF3342	EVR COVER	
102	VYK9973	EVF CASE (UPPER)	
103	VKM5571	EVF CASE (LOWER)	
104	VYQ2165	EVF VIEW ADJ. U.	
105	L5EDDXH00005	EVF LCD PANEL	
106	VGQ5492	EVF PROTECT SHEET	
107	VGQ6265	PROTECT COVER SHEET	
108	VGQ6143	LCD MASK	
109	VJF1422	LCD HOLD PIECE	
110	VJF1423	LCD HOLD COVER	
111	LSFL0039	LED LENS	
112	LSFL0040	LED DIFFUSION SHEET	
113	VGQ6172	EVF PROTECT TAPE	
114	VMG1383	EYE CAP	
115	VWJ1470	EVF FLEX.	
116	VYK9863	EVF SLIDE CASE U.	
117	VKM5569	TOP CASE	
118	VMP6786	ACCESSORY SHOE	
119	VYK9861	FRONT CASE U.	
120	VYF2765	LENS HOOD U.	
121	N9ZZ00000094	SIDE CASE (R) (1) U.	NV-DS27 NV-DS28
121	N9ZZ00000097	SIDE CASE (R) (1) U.	NV-DS37 NV-DS38
B101	VHD1303	SCREW	
B102	VHD1303	SCREW	
B103	XQN16+B4FN	SCREW	
B104	XQN16+B4FN	SCREW	
B105	XQN16+B4FN	SCREW	
B106	XQN16+B4FN	SCREW	
B107	XQN16+B4FN	SCREW	
B108	XQN16+BJ6FN	SCREW	
B109	XQN16+BJ6FN	SCREW	
B110	XQN16+BJ5FZ	SCREW	
B111	XQN16+BJ5FZ	SCREW	
B112	XQS2+A55FN	SCREW	
B113	XQS2+A55FN	SCREW	
B114	XQS2+A55FN	SCREW	
B115	XQN2+BJ10FN	SCREW	
B116	XQN2+BJ10FN	SCREW	

14.2. FRAME & CASING SECTION (2) PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
201	VKF3343	JACK COVER	
202	VYQ2164	MECHA. FRAME U.	
203	K4BZ06Z00001	BATTERY CASE U.	
204	N9ZZ00000089	SIDE CASE (L) U.	NV-DS27,NV-DS28EG/EGM/B
204	N9ZZ00000099	SIDE CASE (L) U.	NV-DS28EN/ENC/ENT/A
204	N9ZZ00000092	SIDE CASE (L) U.	NV-DS37
204	N9ZZ00000100	SIDE CASE (L) U.	NV-DS38
205	VYK9864	CASSETTE COVER U.	
206	VMP6787	LENS FRAME	
207	VXY1629	MECHA. CHASSIS	(RTL)
B201	VHD1422	SCREW	
B202	VHD1422	SCREW	
B203	VHD1422	SCREW	
B204	VHD1421	SCREW	
B205	VHD1421	SCREW	
B206	XQN16+BJ4FZ	SCREW	
B207	XQN16+BJ4FZ	SCREW	
B208	XQN16+BJ4FZ	SCREW	
B209	XQN16+BJ5FZ	SCREW	
B210	XQN16+BJ8FZ	SCREW	
B211	XQN16+BJ8FZ	SCREW	
B212	XQN16+B4FZ	SCREW	
B213	XQN16+B4FZ	SCREW	
B214	XQN16+B4FZ	SCREW	
B215	XQN16+B4FZ	SCREW	
B216	XQN16+B4FZ	SCREW	
B217	XQN16+B4FZ	SCREW	
B218	XQN16+B4FN	SCREW	

14.3. LCD SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
301	VGQ6171	PROTECT SHEET	
302	VGQ6181	LCD INSULATION SHEET	
303	EDTCA29QJ0	MONITOR LCD PANEL	
304	VKW2909	LIGHT GUIDE PLATE	
305	VGL0929	REFLECTION SHEET	
306	KC56D1889DH	FLUORESCENCE TUBE	
307	VGQ6138	FLUORESCENCE TUBE RUBBER	
308	VGQ6138	FLUORESCENCE TUBE RUBBER	
309	VGL0927	DIFFUSION SHEET	
310	VGQ5810	MF INSULATION SHEET	
311	VGQ6170	LCD PANEL FIXING SHEET	
312	VGQ6170	LCD PANEL FIXING SHEET	
313	VGQ6170	LCD PANEL FIXING SHEET	
314	VSC5206	LCD FRAME	
315	VSC5211	LCD SHIELD CASE	
316	VGQ6272	LCD LIGHT INSULATION BARRIER	
317	VKM5568	LCD CASE (LOWER)	
318	VYK9866	LCD CASE (UPPER) U.	NV-DS27
318	VYK9875	LCD CASE (UPPER) U.	NV-DS28EG/EGM/B
318	VYK9935	LCD CASE (UPPER) U.	NV-DS28EN/ENC/ENT/A
318	VYK9929	LCD CASE (UPPER) U.	NV-DS37
318	VYK9930	LCD CASE (UPPER) U.	NV-DS38EG/EGM/B
318	VYK9975	LCD CASE (UPPER) U.	NV-DS38EN/ENT/A
B301	XQN16+BJ6FN	SCREW	
B302	XQN16+BJ6FN	SCREW	

14.4. CAMERA LENS SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
401	VDL1193	CRYSTAL FILTER	
402	VEK9291	CCD U.	
403	VJB22308	CCD FLEX.	
404	VMX3070	CCD CUSHION	
405	VXW0498	LENS U.	
406	10S1F10F6NF	ZOOM MOTOR U.	
407	10S1F10F7NF	FOCUS MOTOR U.	
408	CNA1302KR0SL	PHOTOSENSOR	
409	CNA1302KR0SL	PHOTOSENSOR	
410	L9ZZ00000184	IRIS U.	
411	VDW0740	MASTER FLANGE	
412	VEK9290	LENS FLEX. U.	
413	VMB3504	F SPRING	
414	VML3592	LEVER	
415	VMP6769	PROTECT SHEET	
416	VMS6943	GUIDE POLE	
417	VMS6943	GUIDE POLE	
418	VXP2122	2ND MOVING FRAME U.	
419	VXP2124	4TH MOVING FRAME U.	
420	VXQ1010	MAIN FRAME U.	
421	VXQ1011	3RD MOVING FRAME U.	
422	VDW0742	F FIX FRAME	
423	VMS6838	F GUIDE POLE	
424	VXQ1012	F FRAME U.	
B401	VHD0852	SCREW	
B402	VHD0852	SCREW	
B403	XQN16+CJ5	SCREW	
B404	XQN16+CJ5	SCREW	
B405	XQN16+CJ5	SCREW	
B406	XQN16+CJ5	SCREW	
B407	XQN16+CJ5	SCREW	
B408	XQN16+CJ5	SCREW	
B409	XQN16+CJ5	SCREW	
B410	XQN16+CJ5	SCREW	
B411	XQN16+CJ5	SCREW	
B412	XQN16+CJ5	SCREW	
B413	XQN16+CJ8	SCREW	
B414	XQN16+CJ8	SCREW	
B415	XQN16+CJ8	SCREW	
B416	XQN16+CJ6	SCREW	
B417	XQN16+CJ6	SCREW	

14.5. PACKING PARTS & ACCESSORIES SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	
501	VPG0J67	PACKING	NV-DS27E
501	VPG0J87	PACKING	NV-DS27E
501	VPG0J84	PACKING	NV-DS27E
501	VPG0J83	PACKING	NV-DS28E
501	VPG0J85	PACKING	NV-DS28E
501	VPG0J88	PACKING	NV-DS28E
501	VPG0J68	PACKING	NV-DS28E
501	VPG0K76	PACKING	NV-DS37E
501	VPG0K77	PACKING	NV-DS37E
501	VPG0K78	PACKING	NV-DS37E
501	VPG0K79	PACKING	NV-DS38E
501	VPG0K80	PACKING	NV-DS38E
501	VPG0K81	PACKING	NV-DS38E
501	VPG0K82	PACKING	NV-DS38E
502	VQT9150	OPERATING INSTRUCTIONS(GERMAN,FRENCH,ITALIAN,DUTCH)	⚠ NV-DS
502	VQT9154	OPERATING INSTRUCTIONS(ENGLISH)	⚠ NV-DS
502	VQT9196	OPERATING INSTRUCTIONS(ENGLISH,CZECH,POLISH,HUNGARIANS)	⚠ NV-DS
502	VQT9152	OPERATING INSTRUCTIONS(GERMAN,SPANISH,SWEDISH,DANISH)	⚠ NV-DS DS38EGM
502	VQT9155	OPERATING INSTRUCTIONS(ENGLISH,CHINESE,RUSSIAN,ARABIC)	⚠ NV-DS
502	VQT9371	OPERATING INSTRUCTIONS(ENGLISH)	⚠ NV-DS
503	VPN5399	SPACER PAD	
504	VPN5548	CUSHION	
505	K2KC4CB00002	AV CABLE	
506	K2GJ2DC00004	DC CABLE	
507	N2QAEC000003	REMOTE CONTROLLER	
508	VJA0664	AC CORD	⚠ NV-DS ENT,NV-D K2CR2DA
508	VJA0754	AC CORD	⚠ NV-DS
509	VJA0940	AC CORD	⚠ NV-DS EN/ENT
510	VYF2764	HOOD CAP U.	
511	VJA1122	INTERFACE CABLE	NV-DS28E K1V208A1
512	VFF0105	CD ROM FOR PC KIT	NV-DS28E
512	VFF0079	CD ROM FOR PC KIT	NV-DS37,I
513	VFK1451	HEAD CLEANER	NV-DS28E
514	RP-SD008MVE0	SD CARD	NV-DS37,I
515	VQT9193	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ ENGLISH, CHINESE, RUSSIAN)	⚠ NV-DS
515	VQT9191	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ GERMAN, FRENCH, ITALIAN, DUTCH)	⚠ NV-DS
515	VQT9192	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ GERMAN, SPANISH, SWEDISH, DANISH)	⚠ NV-DS
515	VQT9365	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ ENGLISH)	⚠ NV-DS
517	VFC3299-A	SHOULDER BELT	

14.6. ELECTRICAL REPLACEMENT PARTS LIST

Note: 1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE: Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.
3. Unless otherwise specified,
All resistors are in OHMS, K=1,000 OHMS. All capacitors are in MICROFARADS (uf), P=uuF.
4. The P.C. Board units marked width "■" show below the main assembled parts.
5. The marking (RTL) indicaters the retention time is limited for this item.
After the discontinuation of this assembly in production, it will no longer be available.

Ref. No.	Part No.	Part Name & Description	Remarks
Ref.No	Part No	Part Name & Description	Remarks
■	VEP03F85A	MAIN C.B.A.	(RTL)NV-DS27EG/EGM/EGE/B,NV-DS28EG/EGM/B
■	VEP03F85B	MAIN C.B.A.	(RTL)NV-DS28EN/ENC/ENT/A
■	VEP03F85C	MAIN C.B.A.	(RTL)NV-DS37EG/EGM/B
■	VEP03F85D	MAIN C.B.A.	(RTL)NV-DS38EG/EGM/B/EN/ENT/A
■	VEP03F86A	DSC/EX IN C.B.A.	NV-DS28EN/ENC/ENT/A
			THE COMPONENT PARTS IN THIS C.B.A. ARE NOT SUPPLIED.(SEE INTRODUCTION PAGE IN THIS MANUAL)
■	VEP03F86B	DSC/EX IN C.B.A.	NV-DS37EG/EGM/B
			THE COMPONENT PARTS IN THIS C.B.A. ARE NOT SUPPLIED.(SEE INTRODUCTION PAGE IN THIS MANUAL)
■	VEP03F86C	DSC/EX IN C.B.A.	NV-DS38EG/EGM/B/EN/ENT/A
			THE COMPONENT PARTS IN THIS C.B.A. ARE NOT SUPPLIED.(SEE INTRODUCTION PAGE IN THIS MANUAL)
■	VEP04773A	FRONT C.B.A.	
■	VEP28284A	EVF C.B.A.	(RTL)
■	VEP26254A	MONITOR C.B.A.	(RTL)INCLUDING THE HALL SENSOR C.B.A.(VEP06E18A).
■	VEP06E18A	HALL SENSOR C.B.A.	(RTL)INCLUDED IN MONITOR C.B.A.(VEP26254A)
■	VEP22308A	CCD FLEX.CARD C.B.A.	(RTL)
■	VEK9290	LENS FLEX.CARD C.B.A.	(RTL)
■	VEP04773A	FRONT C.B.A.	
C491	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C492	ECUX0J474KBV	C.CAPACITOR CH 6.3V 0.47U	
C2803	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C2804	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C2805	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	

Ref. No.	Part No.	Part Name & Description	Remarks
C2807	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C2810	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4501	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C4502	ECST0JY226Z	T.CAPACITOR CH 6.3V 22U	
C4801	ECUX1C183KBV	C.CAPACITOR CH 16V 0.018U	
C4802	ECUX1C183KBV	C.CAPACITOR CH 16V 0.018U	
C4803	ECUX1C223KBV	C.CAPACITOR CH 16V 0.022U	
C4804	ECUX1C223KBV	C.CAPACITOR CH 16V 0.022U	
C4805	ECUX1H103KBV	C.CAPACITOR CH 50V 0.01U	
C4806	ECUX1H103KBV	C.CAPACITOR CH 50V 0.01U	
C4901	ECUX1H222KBV	C.CAPACITOR CH 50V 2200P	
C4902	ECUX1H222KBV	C.CAPACITOR CH 50V 2200P	
C4903	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4905	VCEV0JHY470R	E.CAPACITOR CH 6.3V 47U	F2H0J470A003
C4906	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C4907	ECUX1H472KBV	C.CAPACITOR CH 50V 4700P	
C4908	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4910	VCEV0JHY470R	E.CAPACITOR CH 6.3V 47U	F2H0J470A003
C4911	VCEV0JHY470R	E.CAPACITOR CH 6.3V 47U	F2H0J470A003
C4913	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4950	ECUX1H472KBV	C.CAPACITOR CH 50V 4700P	
C6401	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C6402	F3F0J1060005	TANTALUM CAPACITOR	
D491	MA132WA	DIODE	
D2802	MA2S728	DIODE	
D4501	02DZ6.2YTPH3	DIODE	B0BC6R100014
D4502	02DZ6.2YTPH3	DIODE	B0BC6R100014
D4503	02DZ6.2YTPH3	DIODE	B0BC6R100014
D6801	CL170UR-CD	CHIP LED	
D6802	PH310	DIODE	
D6803	SLR738AV50AC	LED	B3EA00000029
D6804	SLR738AV50AC	LED	B3EA00000029
FP4903	VJS3971B039	CONNECTOR (FEMALE) 39P	
IC2801	C0ZBZ0000540	IC	
IR6401	PNA4611M05VT	IR RECEIVER	
JK2501	K4BZ25B00001	JACK UNIT	
JK4502	VJJ0568	RCA JACK	
L4501	VLQ0855M4R7	COIL 4.7UH	G1C4R7M00016
LB4901	J0JCC0000164	FILTER	
LB4905	VLP0335	COIL	J0JBC0000013
LB4906	VLP0335	COIL	J0JBC0000013
Q491	2SD1030	TRANSISTOR	
Q492	2SD1819A-R	TRANSISTOR	
Q4801	2SD1819A-R	TRANSISTOR	
Q4802	2SD1819A-R	TRANSISTOR	
Q4901	2SD1819A-R	TRANSISTOR	
Q4902	2SB1218A	TRANSISTOR	
Q4903	2SD1819A-R	TRANSISTOR	
Q4904	2SB1218A	TRANSISTOR	

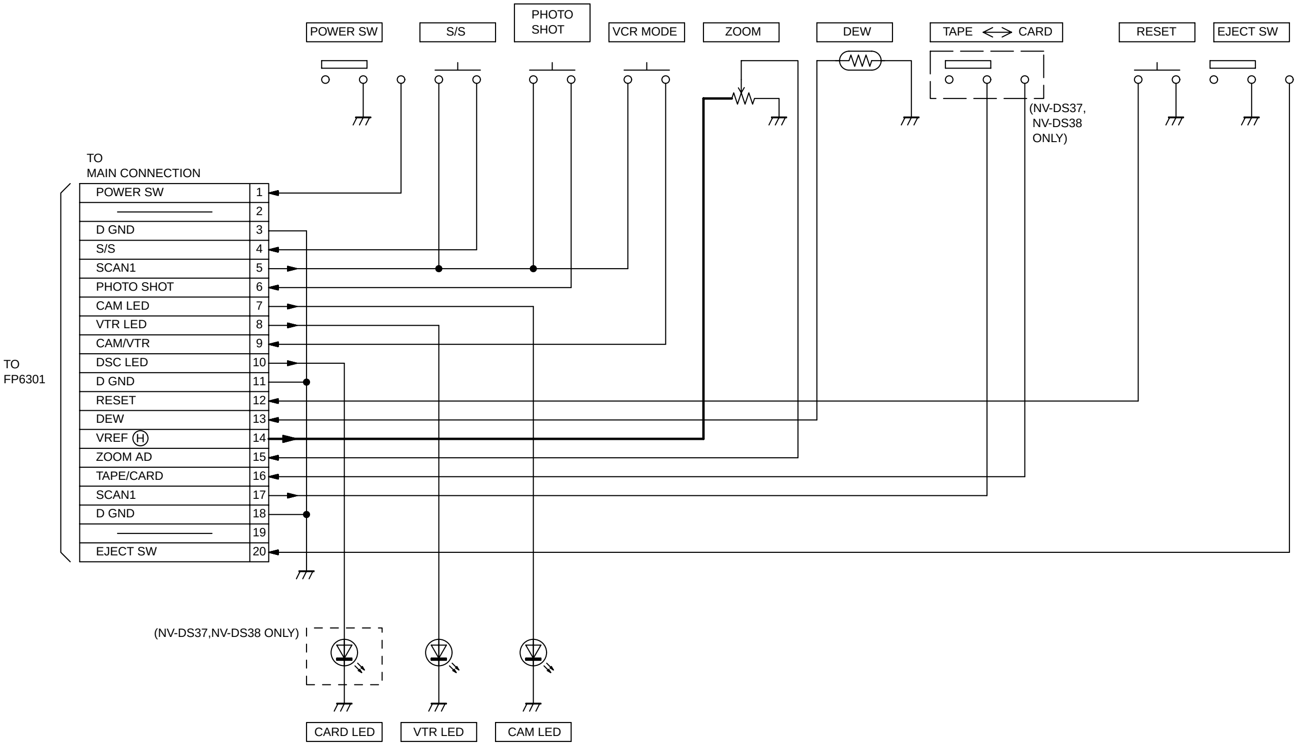
Ref. No.	Part No.	Part Name & Description	Remarks
Q4905	**2SD1819A-R**	**TRANSISTOR**	
Q4906	**2SD1819A-R**	**TRANSISTOR**	
Q4907	**2SD1819A-R**	**TRANSISTOR**	
R491	**ERJ3GEYJ225**	**M.RESISTOR CH 1/16W 2.2K**	
R492	**ERJ3GEYJ334**	**M.RESISTOR CH 1/16W 330K**	
R493	**ERJ3GEYJ472**	**M.RESISTOR CH 1/16W 4.7K**	
R494	**ERJ3GEYJ182**	**M.RESISTOR CH 1/16W 1.8K**	
R495	**ERJ3GEYJ106**	**M.RESISTOR CH 1/16W 10M**	
R2501	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R2801	**ERJ3GEYJ101**	**M.RESISTOR CH 1/16W 100**	
R2802	**ERJ3GEYJ101**	**M.RESISTOR CH 1/16W 100**	
R2808	**ERJ6GEY0R00**	**M.RESISTOR CH 1/10W 0**	
R4505	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4507	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4801	**ERJ6GEYJ392**	**M.RESISTOR CH 1/10W 3.9K**	
R4802	**ERJ6GEYJ392**	**M.RESISTOR CH 1/10W 3.9K**	
R4803	**ERJ3GEYJ563**	**M.RESISTOR CH 1/16W 56K**	
R4804	**ERJ3GEYJ563**	**M.RESISTOR CH 1/16W 56K**	
R4805	**ERJ3GEYJ104**	**M.RESISTOR CH 1/16W 100K**	
R4806	**ERJ3GEYJ104**	**M.RESISTOR CH 1/16W 100K**	
R4807	**ERJ3GEYJ332**	**M.RESISTOR CH 1/16W 3.3K**	
R4808	**ERJ3GEYJ332**	**M.RESISTOR CH 1/16W 3.3K**	
R4809	**ERJ3GEYJ393**	**M.RESISTOR CH 1/16W 39K**	
R4810	**ERJ3GEYJ393**	**M.RESISTOR CH 1/16W 39K**	
R4811	**ERJ3GEYJ104**	**M.RESISTOR CH 1/16W 100K**	
R4812	**ERJ3GEYJ104**	**M.RESISTOR CH 1/16W 100K**	
R4901	**ERJ3GEYJ682**	**M.RESISTOR CH 1/16W 6.8K**	
R4902	**ERJ3GEYJ104**	**M.RESISTOR CH 1/16W 100K**	
R4903	**ERJ3GEYJ682**	**M.RESISTOR CH 1/16W 6.8K**	
R4904	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4905	**ERJ3GEYJ471**	**M.RESISTOR CH 1/16W 470**	
R4906	**ERJ6GEYJ103**	**M.RESISTOR CH 1/10W 10K**	
R4907	**ERJ6GEYJ154**	**M.RESISTOR CH 1/10W 150K**	
R4908	**ERJ6GEYJ563**	**M.RESISTOR CH 1/10W 56K**	
R4909	**ERJ3GEYJ102**	**M.RESISTOR CH 1/16W 1K**	
R4910	**ERJ3GEYJ562**	**M.RESISTOR CH 1/16W 5.6K**	
R4911	**ERJ3GEYJ151**	**M.RESISTOR CH 1/16W 150**	
R4912	**ERJ3GEYJ471**	**M.RESISTOR CH 1/16W 470**	
R4913	**ERJ6GEYJ103**	**M.RESISTOR CH 1/10W 10K**	
R4914	**ERJ6GEYJ154**	**M.RESISTOR CH 1/10W 150K**	
R4915	**ERJ6GEYJ563**	**M.RESISTOR CH 1/10W 56K**	
R4916	**ERJ3GEYJ102**	**M.RESISTOR CH 1/16W 1K**	
R4917	**ERJ3GEYJ562**	**M.RESISTOR CH 1/16W 5.6K**	
R4918	**ERJ3GEYJ151**	**M.RESISTOR CH 1/16W 150**	
R4919	**ERJ3GEYJ472**	**M.RESISTOR CH 1/16W 4.7K**	
R4920	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4921	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4922	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4923	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4924	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4925	**ERJ3GEY0R00**	**M.RESISTOR CH 1/16W 0**	
R4927	**ERJ3GEYJ103**	**M.RESISTOR CH 1/16W 10K**	
R4999	**ERJ3GEYJ101**	**M.RESISTOR CH 1/16W 100**	
R6402	**ERJ6GEYJ470**	**M.RESISTOR CH 1/10W 47**	
R6803	**ERJ6GEYJ181**	**M.RESISTOR CH 1/10W 180**	

Ref. No.	Part No.	Part Name & Description	Remarks
VZ4501	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
VZ4502	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
VZ4503	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
VZ4902	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
		MISCELLANEOUS	
.	VSC5209	MIC SHIELD PLATE	
.	VSC5231	JACK SHIELD PLATE	
.	VGQ6135	IR HOLDER	
.	VWJ1468	FRONT FPC	
■	VEP28284A	EVF C.B.A.	(RTL)
C802	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
D801	B3AFB0000016	LED (WHITE)	
D802	B3AFB0000016	LED (WHITE)	
D803	02DZ6.2YTPH3	DIODE	B0BC6R100014
D804	MA133	DIODE	
FP802	VJS3931B021	CONNECTOR (FEMALE) 21P	
FP803	K1MN22B00062	CONNECTOR	
Q801	XP4501	TRANSISTOR-TRANSISTOR	
R801	ERJ3GEYJ472	M.RESISTOR CH 1/16W 4.7K	
R803	ERJ3RED470	M.RESISTOR CH 1/16W 47	
R804	ERJ3RED470	M.RESISTOR CH 1/16W 47	
R805	ERJ3GEYJ103	M.RESISTOR CH 1/16W 10K	
■	VEP26254A	MONITOR C.B.A.	(RTL)
C903	F3F0J1060005	TANTALUM CAPACITOR	
C906	ECUX1E471KBQ	C.CAPACITOR CH 25V 470P	
C907	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C908	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C909	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C910	ECUX1A104KBQ	C.CAPACITOR CH 10V 0.1U	
C911	ECUX1E471KBQ	C.CAPACITOR CH 25V 470P	
C913	ECUX1E471KBQ	C.CAPACITOR CH 25V 470P	
C916	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C917	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C918	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C921	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C923	ECUM1C106VB	C.CAPACITOR CH 16V 10U	
C927	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C929	ECUX1E152KBQ	C.CAPACITOR CH 25V 1500P	
C931	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C932	ECUM1E105KBM	C.CAPACITOR CH 25V 1U	
C934	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
C935	ECUM1C106VB	C.CAPACITOR CH 16V 10U	
C937	ECUX1A104KBQ	C.CAPACITOR CH 10V 0.1U	
C938	ECUX1H101JCQ	C.CAPACITOR CH 50V 100P	
C939	ECUX1H331GCV	C.CAPACITOR CH 50V 330P	

Ref. No.	Part No.	Part Name & Description	Remarks
C940	ECUX1H560JCQ	C.CAPACITOR CH 50V 56P	
C941	ECUX1H100CCQ	C.CAPACITOR CH 50V 10P	
C942	ECUM1C474KBN	C.CAPACITOR CH 16V 0.47U	
C943	ECUX1A224KBV	C.CAPACITOR CH 10V 0.22U	
C944	ECUX1A224KBV	C.CAPACITOR CH 10V 0.22U	
C945	ECUX1E332KBQ	C.CAPACITOR CH 25V 3300P	
C946	ECUM1C106VB	C.CAPACITOR CH 16V 10U	
C947	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C948	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C950	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
C952	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C953	ECUX1C103KBQ	C.CAPACITOR CH 16V 0.01U	
D903	DAP222	DIODE	
D904	MA159A	DIODE	
D905	MA6S121	DIODE	
D906	MA111	DIODE	
D908	02DZ6.2YTPH3	DIODE	B0BC6R100014
FP901	VJS3320B024	CONNECTOR (FEMALE) 24P	K1MN24B00036
FP903	K1MN25B00033	CONNECTOR	
IC901	AN2540FHQ-V	IC	
IC902	TC4W53FU	IC	
IC908	SN74LV04APW	IC	C0JBAB000247
IC991	DN8797MS	HALL IC	
L901	VLQ0807K100	COIL 10UH	G1C100K00024
L905	VLQ0807K100	COIL 10UH	G1C100K00024
Q901	HN1C01FUYR	TRANSISTOR	B1HBCFA00001
Q902	2SK2159	TRANSISTOR	
Q903	HN1B04FUGRR	TRANSISTOR	B1HFCFE00001
Q905	HN1B04FUGRR	TRANSISTOR	B1HFCFE00001
Q906	2SA1832FY	TRANSISTOR	
QR901	DTC144TH	DIGITAL TRANSISTOR	
QR902	DTC114YH	DIGITAL TRANSISTOR	
QR903	DTC114YH	DIGITAL TRANSISTOR	
QR904	DTC144TH	DIGITAL TRANSISTOR	
QR905	UN9212	TRANSISTOR-RESISTOR	
R901	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R903	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	
R904	ERJ3RBD622	M.RESISTOR CH 1/16W 6.2K	
R907	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R908	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R909	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R910	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R912	ERJ3GEYJ334	M.RESISTOR CH 1/16W 330K	
R914	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R915	ERJ3RBD333	M.RESISTOR CH 1/16W 33K	
R917	ERJ3RBD103	M.RESISTOR CH 1/16W 10K	
R918	ERJ3GEYJ272	M.RESISTOR CH 1/16W 2.7K	
R919	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R920	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R921	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	

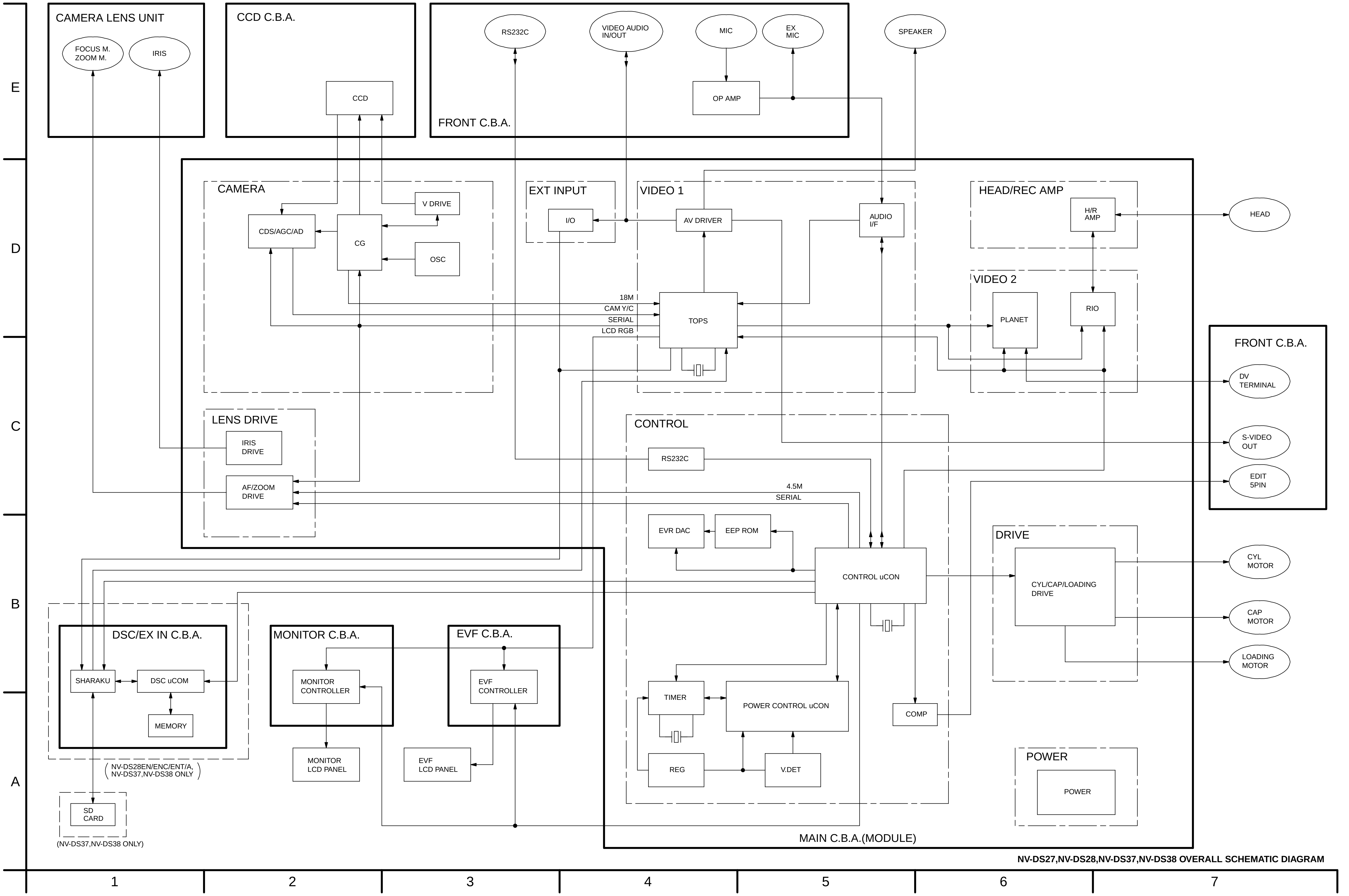
Ref. No.	Part No.	Part Name & Description	Remarks
R922	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R923	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R924	ERJ3GEYJ223	M.RESISTOR CH 1/16W 22K	
R925	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	
R926	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R927	ERJ3GEYJ393	M.RESISTOR CH 1/16W 39K	
R928	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R929	ERJ3GEYJ220	M.RESISTOR CH 1/16W 22	
R930	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R931	ERJ3GEYJ393	M.RESISTOR CH 1/16W 39K	
R932	ERJ3RBD203	M.RESISTOR CH 1/16W 20K	
R933	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R934	ERJ3GEYJ103	M.RESISTOR CH 1/16W 10K	
R936	ERJ3GEYJ473	M.RESISTOR CH 1/16W 47K	
R937	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R938	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R939	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R940	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R941	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R942	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R943	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R945	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R946	ERJ3GEYJ102	M.RESISTOR CH 1/16W 1K	
R947	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R948	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R949	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R950	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R951	ERJ3GEYJ560	M.RESISTOR CH 1/16W 56	
R952	ERJ3GEYJ472	M.RESISTOR CH 1/16W 4.7K	
R953	ERJ3GEYJ823	M.RESISTOR CH 1/16W 82K	
R954	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R956	ERJ3RBD103	M.RESISTOR CH 1/16W 10K	
R957	ERJ3RBD101	M.RESISTOR CH 1/16W 100	
R958	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	
R959	ERJ3GEYJ473	M.RESISTOR CH 1/16W 47K	
R960	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R961	ERJ3GEYJ272	M.RESISTOR CH 1/16W 2.7K	
R962	ERJ3GEYJ561	M.RESISTOR CH 1/16W 560	
R963	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R964	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R965	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R966	ERJ3GEYJ152	M.RESISTOR CH 1/16W 1.5K	
R967	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R968	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R969	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R970	ERJ3GEYJ562	M.RESISTOR CH 1/16W 5.6K	
R971	ERJ3GEYJ335	M.RESISTOR CH 1/16W 3.3M	
R972	ERJ3GEYJ224	M.RESISTOR CH 1/16W 220K	
R973	ERJ8GEYJ335	M.RESISTOR CH 1/8W 3.3M	
R974	ERJ8GEYJ335	M.RESISTOR CH 1/8W 3.3M	
R975	ERJ3GEYJ223	M.RESISTOR CH 1/16W 22K	
R976	ERJ3RBD681	M.RESISTOR CH 1/16W 680	
R977	ERJ3RED180	M.RESISTOR CH 1/16W 18	
R978	ERJ6GEYJ335	M.RESISTOR CH 1/10W 3.3M	
R979	ERJ3GEYJ224	M.RESISTOR CH 1/16W 220K	
R980	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R983	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	

Ref. No.	Part No.	Part Name & Description	Remarks
R988	ERJ3GEYJ102	M.RESISTOR CH 1/16W 1K	
T901	ETJ09K59AZ	CHIP TRANSFORMER	
T902	EFTU21R203	TRANSFORMER	
■	VEP22308A	CCD FLEX.CARD C.B.A.	(RTL)
C291	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
C295	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
D291	MA143	DIODE	
PS291	K1KB14A00039	CONNECTOR(FEMALE) 14P	
Q291	2SC3930	CHIP TRANSISTOR	
R292	ERJ6GEYJ822	M.RESISTOR CH 1/10W 8.2K	
		MISCELLANEOUS	
.	VJB22308	CCD FLEX. CARD	
■	VEK9290	LENS FLEX.CARD C.B.A.	(RTL)
		MISCELLANEOUS	
.	HT-120B	HALL SENSOR	
.	VSP1083	DETECTION SWITCH	K0L1BA000015
.	VJB20865	LENS FLEX. CARD	



POWER SW
S/S
PHOTO SHOT
VCR MODE
ZOOM
DEW
TAPE ↔ CARD
RESET
EJECT SW
(NV-DS37, NV-DS38 ONLY)
TO MAIN CONNECTION
TO FP6301
POWER SW 1
2
D GND 3
S/S 4
SCAN1 5
PHOTO SHOT 6
CAM LED 7
VTR LED 8
CAM/VTR 9
DSC LED 10
D GND 11
RESET 12
DEW 13
VREF Ⓗ 14
ZOOM AD 15
TAPE/CARD 16
SCAN1 17
D GND 18
19
EJECT SW 20
(NV-DS37,NV-DS38 ONLY)
CARD LED
VTR LED
CAM LED
A
B
C
1
2
3
4

NV-DS27,NV-DS28,NV-DS37,NV-DS38 SIDE CASE L UNIT SCHEMATIC DIAGRAM


CAMERA LENS UNIT
FOCUS M.
ZOOM M.
IRIS
CCD C.B.A.
CCD
FRONT C.B.A.
RS232C
VIDEO AUDIO
IN/OUT
MIC
EX
MIC
OP AMP
SPEAKER
CAMERA
V DRIVE
CDS/AGC/AD
CG
OSC
EXT INPUT
I/O
VIDEO 1
AV DRIVER
AUDIO
I/F
TOPS
18M
CAM Y/C
SERIAL
LCD RGB
HEAD/REC AMP
H/R
AMP
HEAD
VIDEO 2
PLANET
RIO
FRONT C.B.A.
DV
TERMINAL
S-VIDEO
OUT
EDIT
5PIN
LENS DRIVE
IRIS
DRIVE
AF/ZOOM
DRIVE
CONTROL
RS232C
4.5M
SERIAL
EVR DAC
EEP ROM
CONTROL uCON
DRIVE
CYL/CAP/LOADING
DRIVE
CYL
MOTOR
CAP
MOTOR
LOADING
MOTOR
DSC/EX IN C.B.A.
SHARAKU
DSC uCOM
MEMORY
(NV-DS28EN/ENC/ENT/A,
NV-DS37,NV-DS38 ONLY)
SD
CARD
(NV-DS37,NV-DS38 ONLY)
MONITOR C.B.A.
MONITOR
CONTROLLER
MONITOR
LCD PANEL
EVF C.B.A.
EVF
CONTROLLER
EVF
LCD PANEL
TIMER
POWER CONTROL uCON
REG
V.DET
COMP
POWER
POWER
MAIN C.B.A.(MODULE)
E
D
C
B
A
1
2
3
4
5
6
7

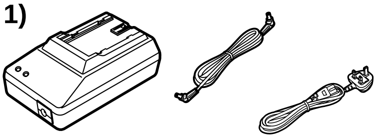
NV-DS27,NV-DS28,NV-DS37,NV-DS38 OVERALL SCHEMATIC DIAGRAM

Standard Accessories

Illustrated on the left are accessories supplied with the Movie Camera.

1) **AC Adaptor, DC Input Lead and AC Mains Lead**
2) **Battery Pack**
3) **Remote Controller and Button-Type Battery**
4) **Button-Type Battery for Built-In Clock**
5) **Lens Cap**
6) **AV Cable**
7) **Shoulder Strap**
8) **SD Memory Card (NV-DS37, NV-DS38 only)**
9) **Personal Computer Connection Kit (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38 only)**
10) **Digital Video Head Cleaner (NV-DS28EN/ENC/ENT/A, NV-DS38EN/ENT/A only)**

1)



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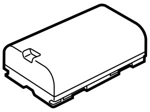

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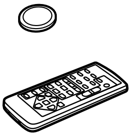
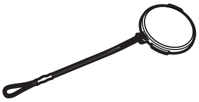
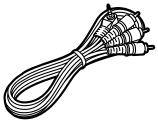


4)

5)



6)



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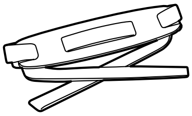

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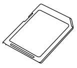

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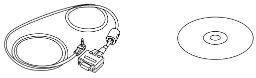

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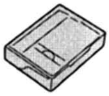
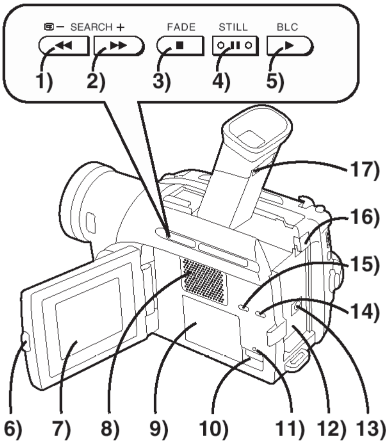


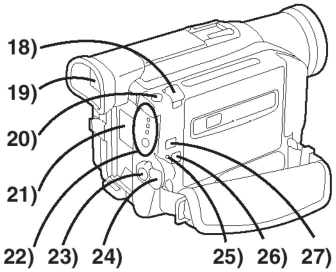


Controls and Components

1) **Reverse Search Button [−SEARCH]**
   Rewind/Review Button [◀◀]
   Recording Check Button [⮌]
2) **Forward Search Button [SEARCH+]**
   Fast Forward/Cue Button [▶▶]
3) **Fade Button [FADE]**
   Stop Button [■]
4) **Still Button [STILL]**
   Pause Button [❚❚]
5) **Backlight Button [BLC]**
   Play Button [▶]
6) **LCD Monitor Open Button [PUSH OPEN]**
7) **LCD Monitor**

- **Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the LCD Monitor screen. However, this is not a malfunction and does not affect the recorded picture.**

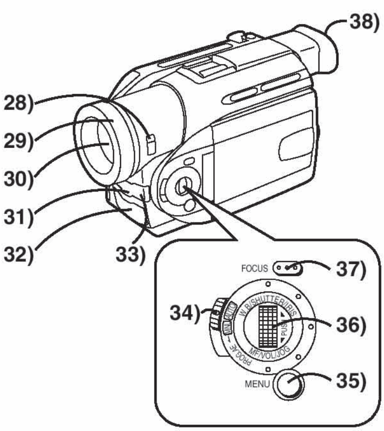
8) **Speaker**
9) **Card Compartment Cover (NV-DS37/DS38 only)**
10) **Card Compartment Open Lever [OPEN] (NV-DS37/DS38 only)**
11) **Card Access Lamp [ACCESS] (NV-DS37/DS38 only)**
12) **Battery Holder**
13) **DC Input Socket [DC IN]**
14) **Card Multi-Picture Button [CARD MULTI] (NV-DS37/DS38 only)**

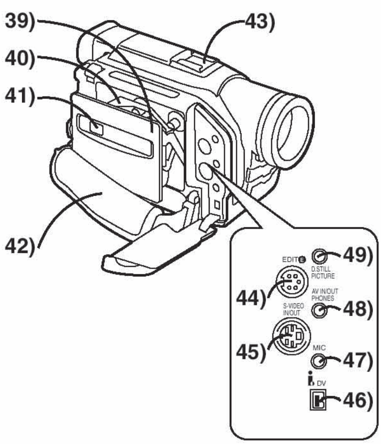


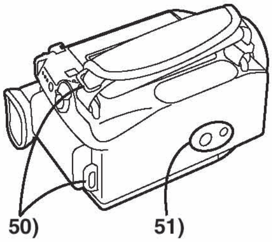
15) **Title Button [TITLE] (NV-DS37/DS38 only)**
16) **Battery Eject Button [PUSH]**
17) **Eyepiece Corrector Knob**
18) **Zoom Lever [W/T]**
19) **Viewfinder**

- **Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the Viewfinder screen. However, this is not a malfunction and does not affect the recorded picture.**

20) **Photoshot Button [PHOTO SHOT]**
21) **Cover of the Button-type Battery's Compartment**
    [BACKUP BATTERY]
22) **Mode Button [MODE]/Mode Lamps**
23) **Recording Start/Stop Button**
24) **Movie Camera Off/On Switch [OFF/ON]**
25) **Reset Button [RESET]**
26) **Cassette Eject Lever [⏏EJECT]**
27) **Tape/Card Photoshot Selector [TAPE/CARD] (NV-DS37/DS38 only)**


28)
29)
30)
31)
32)
33)
38)
34)
37)
36)
35)
FOCUS
W.B/SHUTTER/IRIS
PUSH
MF/VOL/JOG
PROG.AE
MNL
AUTO
MENU


39)
40)
41)
42)
43)
44)
45)
46)
47)
48)
49)
EDIT
D.STILL PICTURE
AV IN/OUT PHONES
S-VIDEO IN/OUT
MIC
DV



28) 0-Lux Recording Switch [0 LUX OFF/ON]

29) Lens Hood

30) Lens

31) Recording Lamp

32) Microphone (built-in, stereo)

33) White Balance Sensor
Remote Control Sensor
Built-in Infra-red Beam Emitters

34) Mode Selector Switch [AUTO/MNL/PROG.AE]

35) Menu Button [MENU]

36) Multi-Function Dial [PUSH]

37) Focus Button [FOCUS]

38) Eyecup

39) Cassette Compartment Cover

40) Cassette Holder

41) Cassette Compartment Lock Button [PUSH LOCK]

42) Grip Belt

43) Accessory Shoe
- Accessories, such as a stereo microphone (VW-VMS2E; optional), are attached here.

44) Edit Socket [EDITⒺ]

45) S-Video Input/Output Socket [S-VIDEO IN/OUT] (Input function on NV-DS38 model only)

46) DV Terminal (i.LINK) [i] (Input function on NV-DS28/DS38 Model only)
- Connect this to the digital video equipment.
- "i.LINK" is the name of connectors in accordance with IEEE1394-1995. "i" is a logo marked on products comforming with the "i.LINK" specifications.

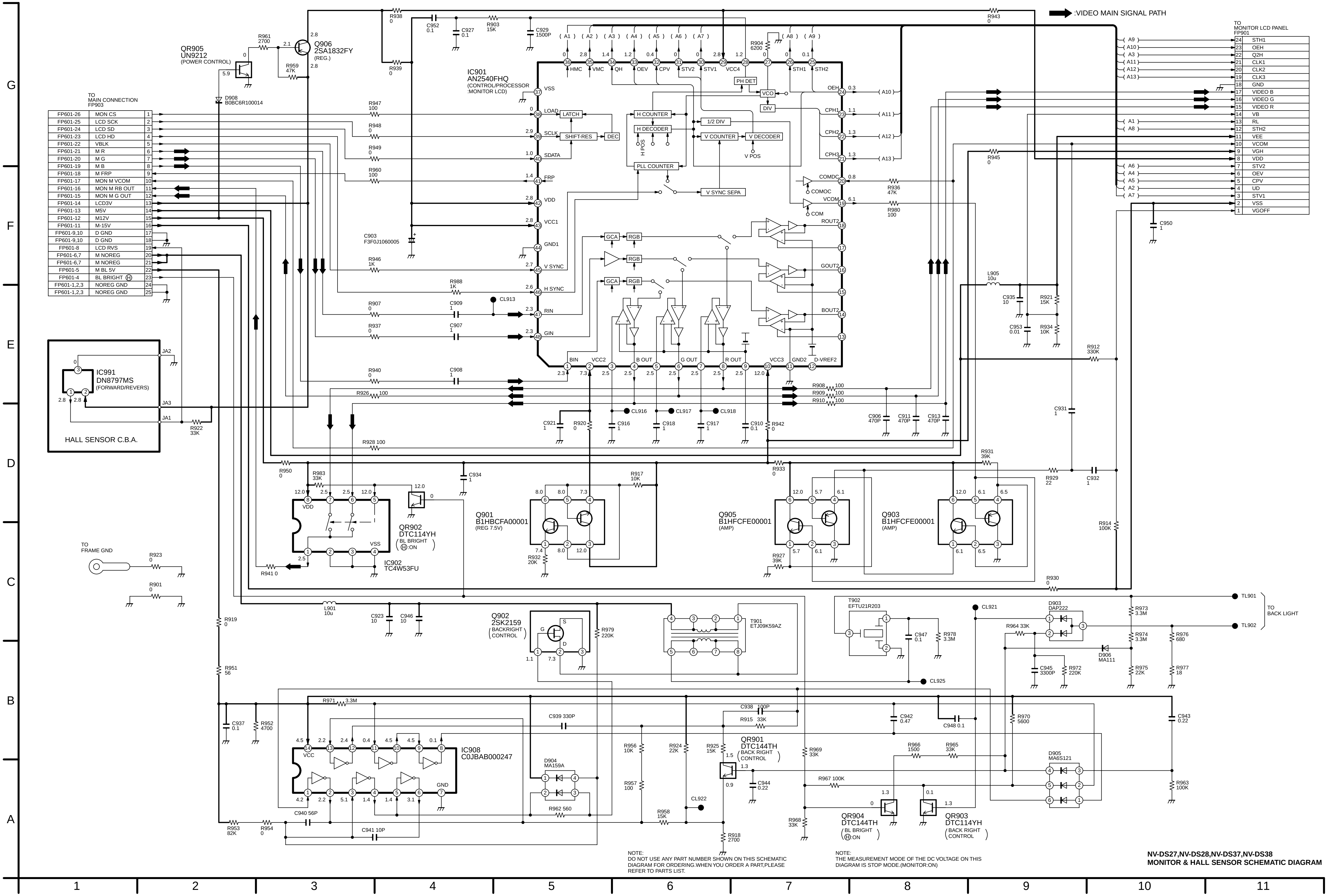
47) Microphone Socket [MIC]
- Connect with an external microphone or audio equipment. (When this socket is in use, the built-in microphone does not operate.)

48) Audio-Video Input/Output Socket [AV IN/OUT] (Input function on NV-DS38 model only)
Headphone Socket [PHONES]
- Connecting an AV Cable to this socket activates the Movie Camera's built-in speaker, but connecting a headphone, etc. deactivates it.

49) Digital Still Picture Terminal [D.STILL PICTURE]

50) Shoulder Strap Holders

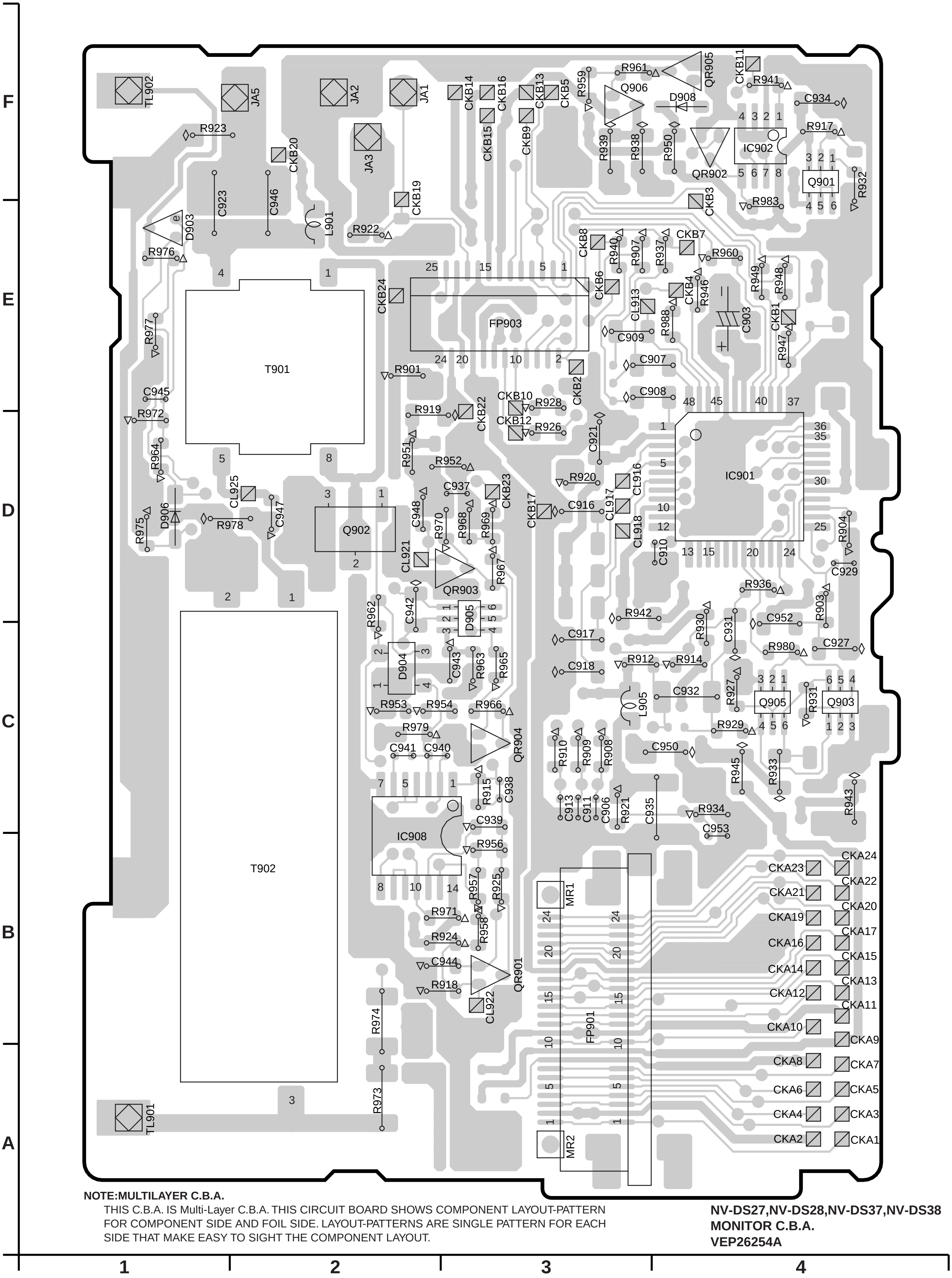
51) Tripod Receptacle
- Used for mounting the Movie Camera on an optional tripod.


:VIDEO MAIN SIGNAL PATH
QR905 UN9212 (POWER CONTROL)
Q906 2SA1832FY (REG.)
IC901 AN2540FHQ (CONTROL/PROCESSOR :MONITOR LCD)
TO MAIN CONNECTION FP903
FP601-26 MON CS 1
FP601-25 LCD SCK 2
FP601-24 LCD SD 3
FP601-23 LCD HD 4
FP601-22 VBLK 5
FP601-21 M R 6
FP601-20 M G 7
FP601-19 M B 8
FP601-18 M FRP 9
FP601-17 MON M VCOM 10
FP601-16 MON M RB OUT 11
FP601-15 MON M G OUT 12
FP601-14 LCD3V 13
FP601-13 M5V 14
FP601-12 M12V 15
FP601-11 M-15V 16
FP601-9,10 D GND 17
FP601-9,10 D GND 18
FP601-8 LCD RVS 19
FP601-6,7 M NOREG 20
FP601-6,7 M NOREG 21
FP601-5 M BL 5V 22
FP601-4 BL BRIGHT Ⓗ 23
FP601-1,2,3 NOREG GND 24
FP601-1,2,3 NOREG GND 25
TO MONITOR LCD PANEL FP901
24 STH1
23 OEH
22 Q2H
21 CLK1
20 CLK2
19 CLK3
18 GND
17 VIDEO B
16 VIDEO G
15 VIDEO R
14 VB
13 RL
12 STH2
11 VEE
10 VCOM
9 VGH
8 VDD
7 STV2
6 OEV
5 CPV
4 UD
3 STV1
2 VSS
1 VGOFF
IC991 DN8797MS (FORWARD/REVERS)
HALL SENSOR C.B.A.
TO FRAME GND
IC902 TC4W53FU
QR902 DTC114YH (BL BRIGHT Ⓗ:ON)
Q901 B1HBCFA00001 (REG 7.5V)
Q905 B1HFCFE00001 (AMP)
Q903 B1HFCFE00001 (AMP)
Q902 2SK2159 (BACKRIGHT CONTROL)
T901 ETJ09K59AZ
T902 EFTU21R203
D903 DAP222
D906 MA111
D905 MA6S121
D904 MA159A
IC908 C0JBAB000247
QR901 DTC144TH (BACK RIGHT CONTROL)
QR904 DTC144TH (BL BRIGHT Ⓗ:ON)
QR903 DTC114YH (BACK RIGHT CONTROL)
TL901
TL902
TO BACK LIGHT
D908 B0BC6R100014
L905 10u
L901 10u
1 2 3 4 5 6 7 8 9 10 11
G F E D C B A

NOTE:
DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NOTE:
THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.(MONITOR:ON)

NV-DS27,NV-DS28,NV-DS37,NV-DS38
MONITOR & HALL SENSOR SCHEMATIC DIAGRAM


F
E
D
C
B
A
1
2
3
4
TL902
JA5
JA2
JA1
JA3
CKB14
CKB16
CKB13
CKB5
CKB15
CKB9
CKB20
CKB19
R959
R961
QR905
CKB11
Q906
D908
R941
C934
R939
R938
R950
QR902
IC902
R917
Q901
R932
R983
CKB3
R923
C923
C946
L901
D903
R922
R976
CKB8
R940
R907
R937
CKB7
R960
R949
R948
CKB6
CKB4
R946
L913
C903
CKB1
R988
C909
R947
CKB24
FP903
C907
C908
T901
R977
C945
R972
R964
R901
CKB2
CKB10
R928
CKB12
R926
R919
CKB22
R951
R952
C921
R920
CL916
IC901
C937
CKB23
CL925
CL917
C916
CKB17
C948
R968
R970
R969
CL918
C910
R904
D906
R975
R978
C947
Q902
CL921
QR903
R967
C929
R936
R903
R962
C942
D905
R942
R930
C931
C952
C917
R980
C927
D904
C943
R963
R965
C918
R912
R914
R927
Q905
R931
Q903
L905
C932
R953
R954
R966
R929
R979
QR904
R910
R909
R908
C950
R945
R933
C941
C940
R915
C938
R943
IC908
C913
C911
C906
R921
C935
R934
C939
C953
R956
T902
MR1
R957
R925
R971
R958
R924
C944
R918
QR901
CL922
R974
FP901
R973
TL901
MR2
CKA24
CKA23
CKA22
CKA21
CKA20
CKA19
CKA17
CKA16
CKA15
CKA14
CKA13
CKA12
CKA11
CKA10
CKA9
CKA8
CKA7
CKA6
CKA5
CKA4
CKA3
CKA2
CKA1

NOTE:MULTILAYER C.B.A.

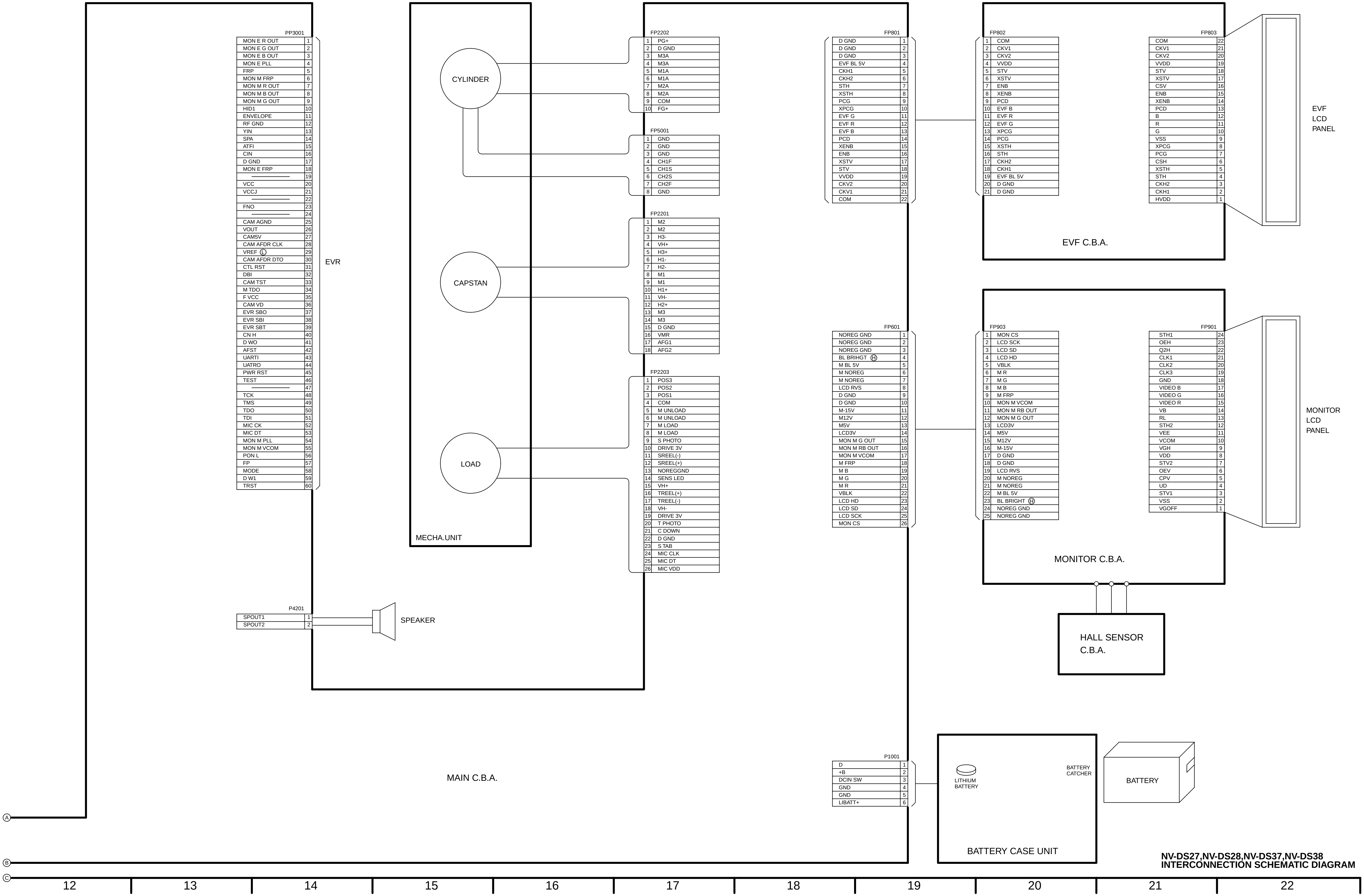
THIS C.B.A. IS Multi-Layer C.B.A. THIS CIRCUIT BOARD SHOWS COMPONENT LAYOUT-PATTERN FOR COMPONENT SIDE AND FOIL SIDE. LAYOUT-PATTERNS ARE SINGLE PATTERN FOR EACH SIDE THAT MAKE EASY TO SIGHT THE COMPONENT LAYOUT.

NV-DS27,NV-DS28,NV-DS37,NV-DS38
MONITOR C.B.A.
VEP26254A

Monitor C.B.A.

Integrated Circuit	
IC901	D-4
IC902	F-4
IC908	B-2
Transistor	
Q901	D-4
Q902	D-2
Q903	C-4
Q905	C-4
Q906	F-3
Transistor & Resistor	
QR901	B-3
QR902	F-4
QR903	D-3
QR904	C-3
QR905	F-4
Connector	
FP901	B-3
FP903	E-3
Test Point	
CL913	E-4
CL916	D-3
CL917	D-3
CL918	D-3
CL921	D-2
CL922	B-3
CL925	D-2
TL901	A-1
TL902	F-1
Diode	
D903	E-1
D904	C-2
D905	C-3
D906	D-1
D908	F-4
Coil	
L901	E-2
L905	C-3
Transformer	
T901	E-2
T902	B-2
Capacitor	
C903	E-4
C906	C-3
C907	E-4
C908	E-4
C909	E-3
C910	D-4
C911	C-3
C913	C-3
C916	D-3
C917	C-3
C918	C-3
C921	D-3
C923	E-1
C927	C-4
C929	D-4
C931	C-4
C932	C-4
C934	F-4
C935	C-4
C937	D-3
C938	C-3
C939	C-3
C940	C-2
C941	C-2
C942	D-2
C943	C-3
C944	B-3
C945	E-1
C946	E-2
C947	D-2
C948	D-2
C950	C-4
C952	C-4
C953	B-4
Resistor	
R901	E-2
R903	D-4
R904	D-4
R907	E-4
R908	C-3
R909	C-3
R910	C-3
R912	C-3
R914	C-4
R915	C-3
R917	F-4
R918	B-3
R919	D-2
R920	D-3
R921	C-3
R922	E-2
R923	F-1
R924	B-3
R925	B-3
R926	D-3
R927	C-4
R928	D-3
R929	C-4
R930	C-4
R931	C-4
R932	F-4
R933	C-4
R934	C-4
R936	D-4
R937	E-4
R938	F-3
R939	F-3
R940	E-4
R941	F-4
R942	C-3
R943	C-4
R945	C-4
R946	E-4
R947	E-4
R948	E-4
R949	E-4
R950	F-4
R951	D-2
R952	D-3
R953	C-2
R954	C-2
R956	B-3
R957	B-3
R958	B-3
R959	F-3
R960	E-4
R961	F-3
R962	D-2
R963	C-3
R964	D-1
R965	C-3
R966	C-3
R967	D-3
R968	D-3
R969	D-3
R970	D-3
R971	B-3
R972	D-1
R973	A-2
R974	B-2
R975	D-1
R976	E-1
R977	E-1
R978	D-2
R979	C-2
R980	C-4
R983	E-4
R988	E-4
Jumper	
JA1	F-2
JA2	F-2
JA3	F-2
JA5	F-2

ADDRESS INFORMATION


PP3001
MON E R OUT 1
MON E G OUT 2
MON E B OUT 3
MON E PLL 4
FRP 5
MON M FRP 6
MON M R OUT 7
MON M B OUT 8
MON M G OUT 9
HID1 10
ENVELOPE 11
RF GND 12
YIN 13
SPA 14
ATFI 15
CIN 16
D GND 17
MON E FRP 18
19
VCC 20
VCCJ 21
22
FNO 23
24
CAM AGND 25
VOUT 26
CAM5V 27
CAM AFDR CLK 28
VREF Ⓛ 29
CAM AFDR DTO 30
CTL RST 31
DBI 32
CAM TST 33
M TDO 34
F VCC 35
CAM VD 36
EVR SBO 37
EVR SBI 38
EVR SBT 39
CN H 40
D WO 41
AFST 42
UARTI 43
UATRO 44
PWR RST 45
TEST 46
47
TCK 48
TMS 49
TDO 50
TDI 51
MIC CK 52
MIC DT 53
MON M PLL 54
MON M VCOM 55
PON L 56
FP 57
MODE 58
D W1 59
TRST 60
EVR
CYLINDER
CAPSTAN
LOAD
MECHA.UNIT
FP2202
1 PG+
2 D GND
3 M3A
4 M3A
5 M1A
6 M1A
7 M2A
8 M2A
9 COM
10 FG+
FP5001
1 GND
2 GND
3 GND
4 CH1F
5 CH1S
6 CH2S
7 CH2F
8 GND
FP2201
1 M2
2 M2
3 H3-
4 VH+
5 H3+
6 H1-
7 H2-
8 M1
9 M1
10 H1+
11 VH-
12 H2+
13 M3
14 M3
15 D GND
16 VMR
17 AFG1
18 AFG2
FP2203
1 POS3
2 POS2
3 POS1
4 COM
5 M UNLOAD
6 M UNLOAD
7 M LOAD
8 M LOAD
9 S PHOTO
10 DRIVE 3V
11 SREEL(-)
12 SREEL(+)
13 NOREGGND
14 SENS LED
15 VH+
16 TREEL(+)
17 TREEL(-)
18 VH-
19 DRIVE 3V
20 T PHOTO
21 C DOWN
22 D GND
23 S TAB
24 MIC CLK
25 MIC DT
26 MIC VDD
P4201
SPOUT1 1
SPOUT2 2
SPEAKER
MAIN C.B.A.
FP801
D GND 1
D GND 2
D GND 3
EVF BL 5V 4
CKH1 5
CKH2 6
STH 7
XSTH 8
PCG 9
XPCG 10
EVF G 11
EVF R 12
EVF B 13
PCD 14
XENB 15
ENB 16
XSTV 17
STV 18
VVDD 19
CKV2 20
CKV1 21
COM 22
FP802
1 COM
2 CKV1
3 CKV2
4 VVDD
5 STV
6 XSTV
7 ENB
8 XENB
9 PCD
10 EVF B
11 EVF R
12 EVF G
13 XPCG
14 PCG
15 XSTH
16 STH
17 CKH2
18 CKH1
19 EVF BL 5V
20 D GND
21 D GND
FP803
COM 22
CKV1 21
CKV2 20
VVDD 19
STV 18
XSTV 17
CSV 16
ENB 15
XENB 14
PCD 13
B 12
R 11
G 10
VSS 9
XPCG 8
PCG 7
CSH 6
XSTH 5
STH 4
CKH2 3
CKH1 2
HVDD 1
EVF LCD PANEL
EVF C.B.A.
FP601
NOREG GND 1
NOREG GND 2
NOREG GND 3
BL BRIHGT Ⓗ 4
M BL 5V 5
M NOREG 6
M NOREG 7
LCD RVS 8
D GND 9
D GND 10
M-15V 11
M12V 12
M5V 13
LCD3V 14
MON M G OUT 15
MON M RB OUT 16
MON M VCOM 17
M FRP 18
M B 19
M G 20
M R 21
VBLK 22
LCD HD 23
LCD SD 24
LCD SCK 25
MON CS 26
FP903
1 MON CS
2 LCD SCK
3 LCD SD
4 LCD HD
5 VBLK
6 M R
7 M G
8 M B
9 M FRP
10 MON M VCOM
11 MON M RB OUT
12 MON M G OUT
13 LCD3V
14 M5V
15 M12V
16 M-15V
17 D GND
18 D GND
19 LCD RVS
20 M NOREG
21 M NOREG
22 M BL 5V
23 BL BRIGHT Ⓗ
24 NOREG GND
25 NOREG GND
FP901
STH1 24
OEH 23
Q2H 22
CLK1 21
CLK2 20
CLK3 19
GND 18
VIDEO B 17
VIDEO G 16
VIDEO R 15
VB 14
RL 13
STH2 12
VEE 11
VCOM 10
VGH 9
VDD 8
STV2 7
OEV 6
CPV 5
UD 4
STV1 3
VSS 2
VGOFF 1
MONITOR LCD PANEL
MONITOR C.B.A.
HALL SENSOR C.B.A.
P1001
D 1
+B 2
DCIN SW 3
GND 4
GND 5
LIBATT+ 6
LITHIUM BATTERY
BATTERY CATCHER
BATTERY CASE UNIT
BATTERY
Ⓐ
Ⓑ
Ⓒ
12
13
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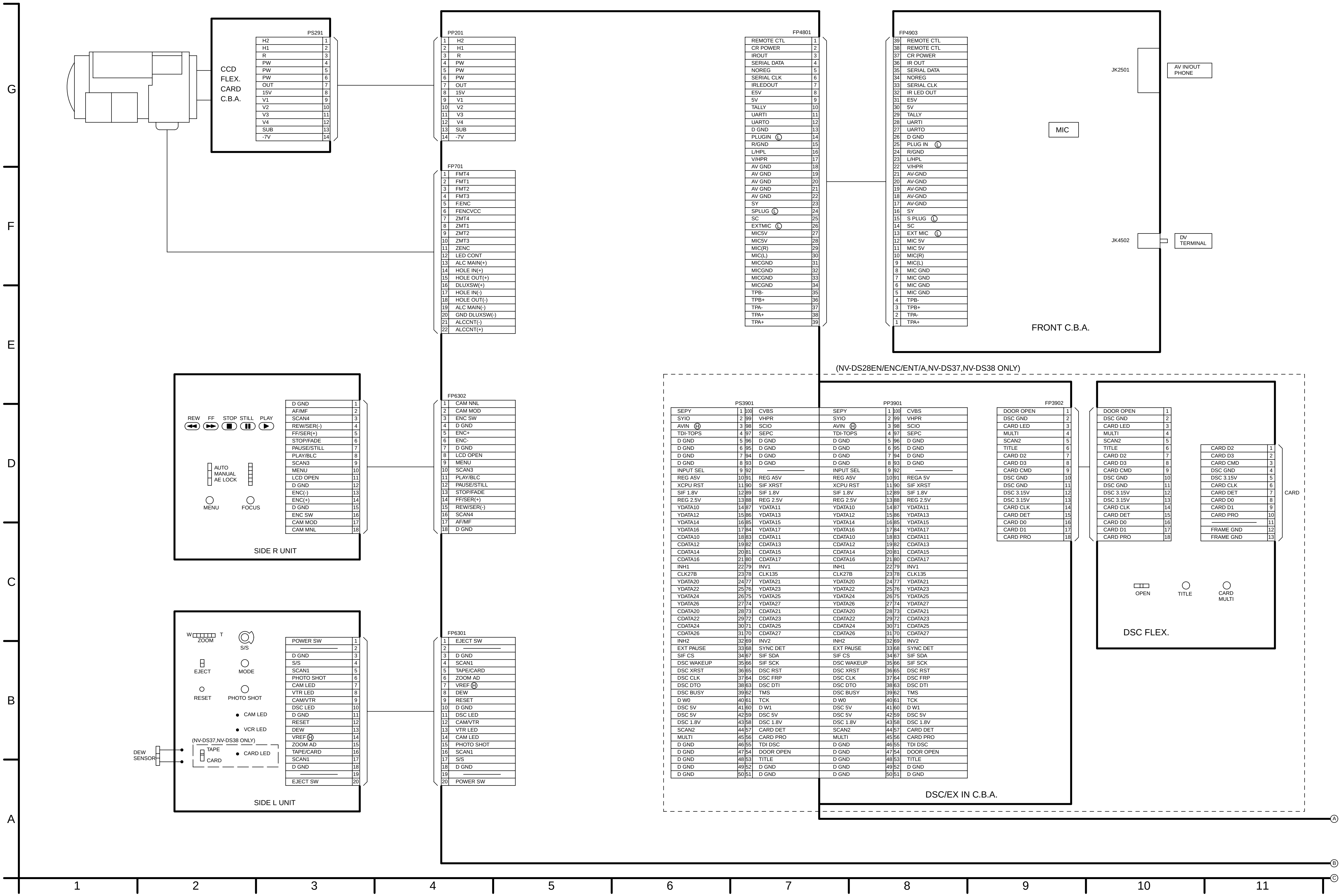
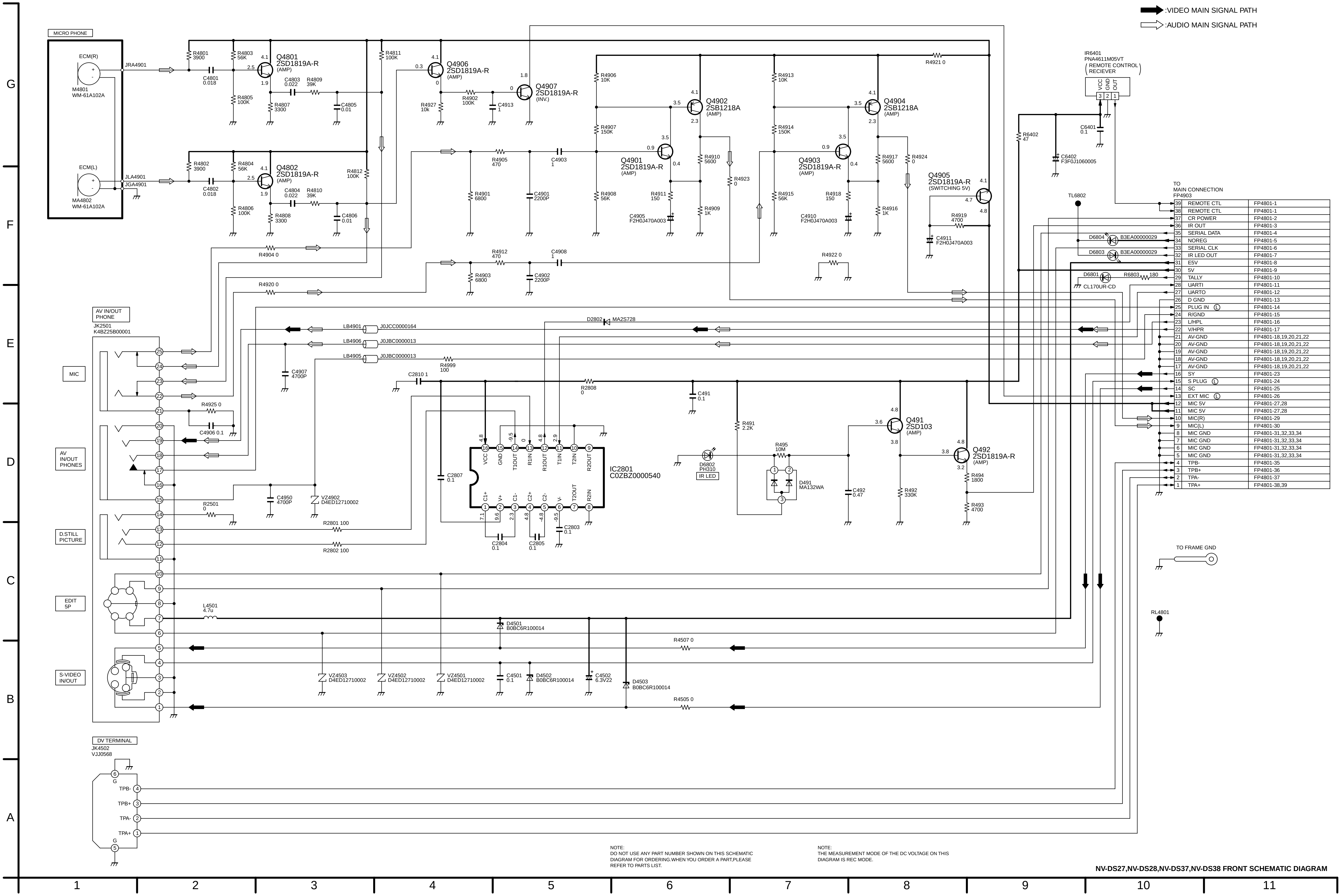
21
22

NV-DS27,NV-DS28,NV-DS37,NV-DS38
INTERCONNECTION SCHEMATIC DIAGRAM

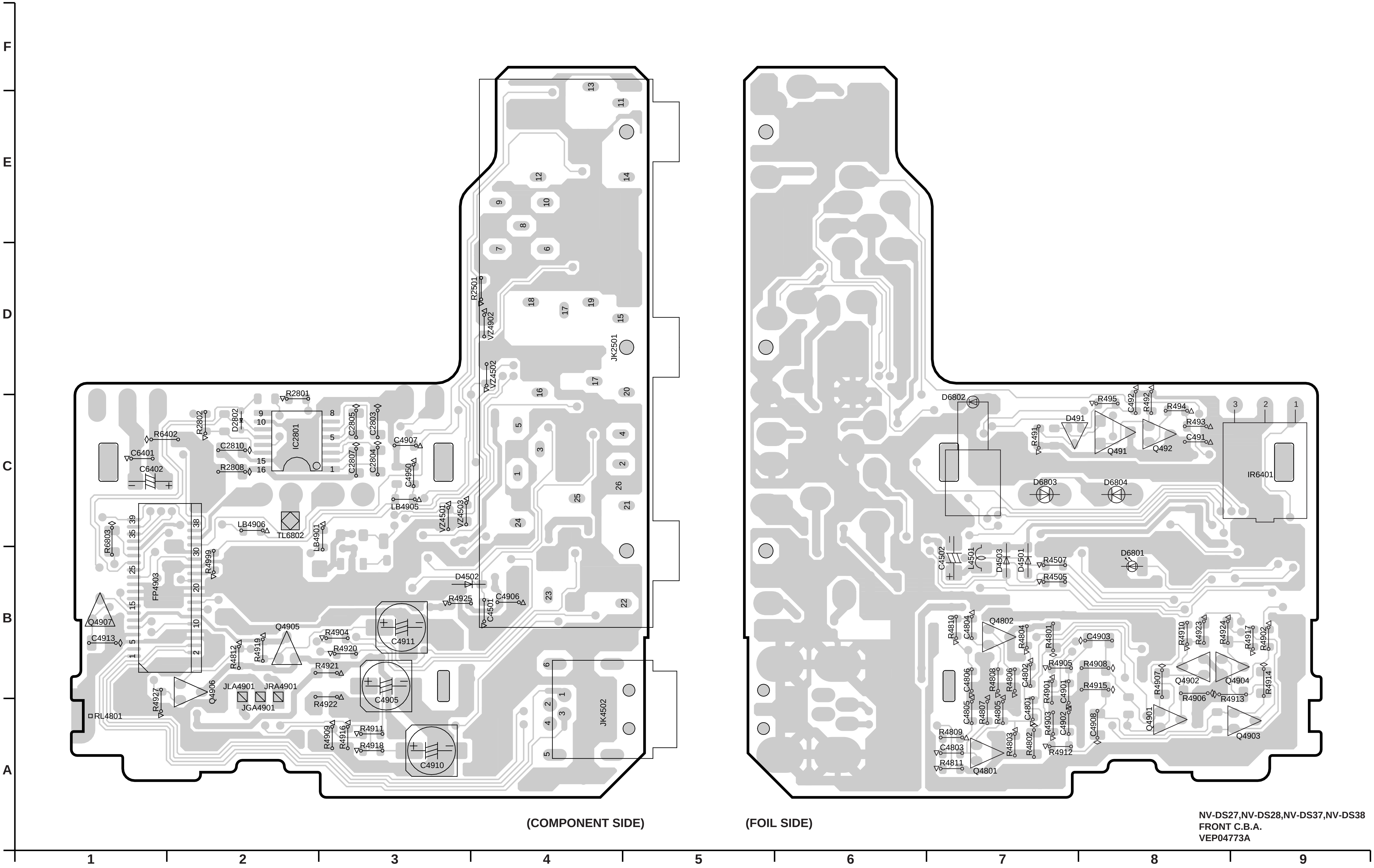

G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
Ⓐ
Ⓑ
Ⓒ
CCD
FLEX.
CARD
C.B.A.
PS291
H2 1
H1 2
R 3
PW 4
PW 5
PW 6
OUT 7
15V 8
V1 9
V2 10
V3 11
V4 12
SUB 13
-7V 14
PP201
1 H2
2 H1
3 R
4 PW
5 PW
6 PW
7 OUT
8 15V
9 V1
10 V2
11 V3
12 V4
13 SUB
14 -7V
FP701
1 FMT4
2 FMT1
3 FMT2
4 FMT3
5 F.ENC
6 FENCVCC
7 ZMT4
8 ZMT1
9 ZMT2
10 ZMT3
11 ZENC
12 LED CONT
13 ALC MAIN(+)
14 HOLE IN(+)
15 HOLE OUT(+)
16 DLUXSW(+)
17 HOLE IN(-)
18 HOLE OUT(-)
19 ALC MAIN(-)
20 GND DLUXSW(-)
21 ALCCNT(-)
22 ALCCNT(+)
FP4801
REMOTE CTL 1
CR POWER 2
IROUT 3
SERIAL DATA 4
NOREG 5
SERIAL CLK 6
IRLEDOUT 7
E5V 8
5V 9
TALLY 10
UARTI 11
UARTO 12
D GND 13
PLUGIN Ⓛ 14
R/GND 15
L/HPL 16
V/HPR 17
AV GND 18
AV GND 19
AV GND 20
AV GND 21
AV GND 22
SY 23
SPLUG Ⓛ 24
SC 25
EXTMIC Ⓛ 26
MIC5V 27
MIC5V 28
MIC(R) 29
MIC(L) 30
MICGND 31
MICGND 32
MICGND 33
MICGND 34
TPB- 35
TPB+ 36
TPA- 37
TPA+ 38
TPA+ 39
FP4903
39 REMOTE CTL
38 REMOTE CTL
37 CR POWER
36 IR OUT
35 SERIAL DATA
34 NOREG
33 SERIAL CLK
32 IR LED OUT
31 E5V
30 5V
29 TALLY
28 UARTI
27 UARTO
26 D GND
25 PLUG IN Ⓛ
24 R/GND
23 L/HPL
22 V/HPR
21 AV-GND
20 AV-GND
19 AV-GND
18 AV-GND
17 AV-GND
16 SY
15 S PLUG Ⓛ
14 SC
13 EXT MIC Ⓛ
12 MIC 5V
11 MIC 5V
10 MIC(R)
9 MIC(L)
8 MIC GND
7 MIC GND
6 MIC GND
5 MIC GND
4 TPB-
3 TPB+
2 TPA-
1 TPA+
JK2501
AV IN/OUT
PHONE
MIC
JK4502
DV
TERMINAL
FRONT C.B.A.
(NV-DS28EN/ENC/ENT/A,NV-DS37,NV-DS38 ONLY)
REW
FF
STOP
STILL
PLAY
AUTO
MANUAL
AE LOCK
MENU
FOCUS
D GND 1
AF/MF 2
SCAN4 3
REW/SER(-) 4
FF/SER(+) 5
STOP/FADE 6
PAUSE/STILL 7
PLAY/BLC 8
SCAN3 9
MENU 10
LCD OPEN 11
D GND 12
ENC(-) 13
ENC(+) 14
D GND 15
ENC SW 16
CAM MOD 17
CAM MNL 18
SIDE R UNIT
FP6302
1 CAM NNL
2 CAM MOD
3 ENC SW
4 D GND
5 ENC+
6 ENC-
7 D GND
8 LCD OPEN
9 MENU
10 SCAN3
11 PLAY/BLC
12 PAUSE/STILL
13 STOP/FADE
14 FF/SER(+)
15 REW/SER(-)
16 SCAN4
17 AF/MF
18 D GND
W
T
ZOOM
S/S
EJECT
MODE
RESET
PHOTO SHOT
CAM LED
VCR LED
(NV-DS37,NV-DS38 ONLY)
TAPE
CARD
CARD LED
DEW
SENSOR
POWER SW 1
2
D GND 3
S/S 4
SCAN1 5
PHOTO SHOT 6
CAM LED 7
VTR LED 8
CAM/VTR 9
DSC LED 10
D GND 11
RESET 12
DEW 13
VREF Ⓗ 14
ZOOM AD 15
TAPE/CARD 16
SCAN1 17
D GND 18
19
EJECT SW 20
SIDE L UNIT
FP6301
1 EJECT SW
2
3 D GND
4 SCAN1
5 TAPE/CARD
6 ZOOM AD
7 VREF Ⓗ
8 DEW
9 RESET
10 D GND
11 DSC LED
12 CAM/VTR
13 VTR LED
14 CAM LED
15 PHOTO SHOT
16 SCAN1
17 S/S
18 D GND
19
20 POWER SW
PS3901
SEPY 1 100 CVBS
SYIO 2 99 VHPR
AVIN Ⓗ 3 98 SCIO
TDI-TOPS 4 97 SEPC
D GND 5 96 D GND
D GND 6 95 D GND
D GND 7 94 D GND
D GND 8 93 D GND
INPUT SEL 9 92
REG A5V 10 91 REG A5V
XCPU RST 11 90 SIF XRST
SIF 1.8V 12 89 SIF 1.8V
REG 2.5V 13 88 REG 2.5V
YDATA10 14 87 YDATA11
YDATA12 15 86 YDATA13
YDATA14 16 85 YDATA15
YDATA16 17 84 YDATA17
CDATA10 18 83 CDATA11
CDATA12 19 82 CDATA13
CDATA14 20 81 CDATA15
CDATA16 21 80 CDATA17
INH1 22 79 INV1
CLK27B 23 78 CLK135
YDATA20 24 77 YDATA21
YDATA22 25 76 YDATA23
YDATA24 26 75 YDATA25
YDATA26 27 74 YDATA27
CDATA20 28 73 CDATA21
CDATA22 29 72 CDATA23
CDATA24 30 71 CDATA25
CDATA26 31 70 CDATA27
INH2 32 69 INV2
EXT PAUSE 33 68 SYNC DET
SIF CS 34 67 SIF SDA
DSC WAKEUP 35 66 SIF SCK
DSC XRST 36 65 DSC RST
DSC CLK 37 64 DSC FRP
DSC DTO 38 63 DSC DTI
DSC BUSY 39 62 TMS
D W0 40 61 TCK
DSC 5V 41 60 D W1
DSC 5V 42 59 DSC 5V
DSC 1.8V 43 58 DSC 1.8V
SCAN2 44 57 CARD DET
MULTI 45 56 CARD PRO
D GND 46 55 TDI DSC
D GND 47 54 DOOR OPEN
D GND 48 53 TITLE
D GND 49 52 D GND
D GND 50 51 D GND
PP3901
SEPY 1 100 CVBS
SYIO 2 99 VHPR
AVIN Ⓗ 3 98 SCIO
TDI-TOPS 4 97 SEPC
D GND 5 96 D GND
D GND 6 95 D GND
D GND 7 94 D GND
D GND 8 93 D GND
INPUT SEL 9 92
REG A5V 10 91 REGA 5V
XCPU RST 11 90 SIF XRST
SIF 1.8V 12 89 SIF 1.8V
REG 2.5V 13 88 REG 2.5V
YDATA10 14 87 YDATA11
YDATA12 15 86 YDATA13
YDATA14 16 85 YDATA15
YDATA16 17 84 YDATA17
CDATA10 18 83 CDATA11
CDATA12 19 82 CDATA13
CDATA14 20 81 CDATA15
CDATA16 21 80 CDATA17
INH1 22 79 INV1
CLK27B 23 78 CLK135
YDATA20 24 77 YDATA21
YDATA22 25 76 YDATA23
YDATA24 26 75 YDATA25
YDATA26 27 74 YDATA27
CDATA20 28 73 CDATA21
CDATA22 29 72 CDATA23
CDATA24 30 71 CDATA25
CDATA26 31 70 CDATA27
INH2 32 69 INV2
EXT PAUSE 33 68 SYNC DET
SIF CS 34 67 SIF SDA
DSC WAKEUP 35 66 SIF SCK
DSC XRST 36 65 DSC RST
DSC CLK 37 64 DSC FRP
DSC DTO 38 63 DSC DTI
DSC BUSY 39 62 TMS
D W0 40 61 TCK
DSC 5V 41 60 D W1
DSC 5V 42 59 DSC 5V
DSC 1.8V 43 58 DSC 1.8V
SCAN2 44 57 CARD DET
MULTI 45 56 CARD PRO
D GND 46 55 TDI DSC
D GND 47 54 DOOR OPEN
D GND 48 53 TITLE
D GND 49 52 D GND
D GND 50 51 D GND
DSC/EX IN C.B.A.
FP3902
DOOR OPEN 1
DSC GND 2
CARD LED 3
MULTI 4
SCAN2 5
TITLE 6
CARD D2 7
CARD D3 8
CARD CMD 9
DSC GND 10
DSC GND 11
DSC 3.15V 12
DSC 3.15V 13
CARD CLK 14
CARD DET 15
CARD D0 16
CARD D1 17
CARD PRO 18
DOOR OPEN 1
DSC GND 2
CARD LED 3
MULTI 4
SCAN2 5
TITLE 6
CARD D2 7
CARD D3 8
CARD CMD 9
DSC GND 10
DSC GND 11
DSC 3.15V 12
DSC 3.15V 13
CARD CLK 14
CARD DET 15
CARD D0 16
CARD D1 17
CARD PRO 18
CARD D2 1
CARD D3 2
CARD CMD 3
DSC GND 4
DSC 3.15V 5
CARD CLK 6
CARD DET 7
CARD D0 8
CARD D1 9
CARD PRO 10
11
FRAME GND 12
FRAME GND 13
CARD
OPEN
TITLE
CARD
MULTI
DSC FLEX.


:VIDEO MAIN SIGNAL PATH
:AUDIO MAIN SIGNAL PATH
MICRO PHONE
ECM(R)
M4801
WM-61A102A
ECM(L)
MA4802
WM-61A102A
JRA4901
JLA4901
JGA4901
R4801 3900
R4802 3900
C4801 0.018
C4802 0.018
R4803 56K
R4804 56K
R4805 100K
R4806 100K
Q4801 2SD1819A-R (AMP)
Q4802 2SD1819A-R (AMP)
C4803 0.022
C4804 0.022
R4809 39K
R4810 39K
R4807 3300
R4808 3300
C4805 0.01
C4806 0.01
R4811 100K
R4812 100K
Q4906 2SD1819A-R (AMP)
R4927 10k
R4902 100K
C4913 1
Q4907 2SD1819A-R (INV.)
R4906 10K
R4907 150K
R4908 56K
Q4901 2SD1819A-R (AMP)
Q4902 2SB1218A (AMP)
R4910 5600
R4909 1K
R4911 150
C4905 F2H0J470A003
R4923 0
R4913 10K
R4914 150K
R4915 56K
Q4903 2SD1819A-R (AMP)
Q4904 2SB1218A (AMP)
R4917 5600
R4916 1K
R4918 150
C4910 F2H0J470A003
R4924 0
R4921 0
Q4905 2SD1819A-R (SWITCHING 5V)
R4919 4700
C4911 F2H0J470A003
R4905 470
C4903 1
R4901 6800
C4901 2200P
R4904 0
R4912 470
C4908 1
R4903 6800
C4902 2200P
R4922 0
R4920 0
IR6401
PNA4611M05VT
REMOTE CONTROL RECIEVER
VCC
GND
OUT
R6402 47
C6401 0.1
C6402 F3F0J1060005
TL6802
D6804 B3EA00000029
D6803 B3EA00000029
D6801 CL170UR-CD
R6803 180
TO MAIN CONNECTION FP4903
39 REMOTE CTL FP4801-1
38 REMOTE CTL FP4801-1
37 CR POWER FP4801-2
36 IR OUT FP4801-3
35 SERIAL DATA FP4801-4
34 NOREG FP4801-5
33 SERIAL CLK FP4801-6
32 IR LED OUT FP4801-7
31 E5V FP4801-8
30 5V FP4801-9
29 TALLY FP4801-10
28 UARTI FP4801-11
27 UARTO FP4801-12
26 D GND FP4801-13
25 PLUG IN L FP4801-14
24 R/GND FP4801-15
23 L/HPL FP4801-16
22 V/HPR FP4801-17
21 AV-GND FP4801-18,19,20,21,22
20 AV-GND FP4801-18,19,20,21,22
19 AV-GND FP4801-18,19,20,21,22
18 AV-GND FP4801-18,19,20,21,22
17 AV-GND FP4801-18,19,20,21,22
16 SY FP4801-23
15 S PLUG L FP4801-24
14 SC FP4801-25
13 EXT MIC L FP4801-26
12 MIC 5V FP4801-27,28
11 MIC 5V FP4801-27,28
10 MIC(R) FP4801-29
9 MIC(L) FP4801-30
8 MIC GND FP4801-31,32,33,34
7 MIC GND FP4801-31,32,33,34
6 MIC GND FP4801-31,32,33,34
5 MIC GND FP4801-31,32,33,34
4 TPB- FP4801-35
3 TPB+ FP4801-36
2 TPA- FP4801-37
1 TPA+ FP4801-38,39
AV IN/OUT PHONE
JK2501
K4BZ25B00001
MIC
AV IN/OUT PHONES
D.STILL PICTURE
EDIT 5P
S-VIDEO IN/OUT
LB4901 J0JCC0000164
LB4906 J0JBC0000013
LB4905 J0JBC0000013
D2802 MA2S728
R4999 100
C4907 4700P
R4925 0
C4906 0.1
C2810 1
R2808 0
C491 0.1
IC2801
C0ZBZ0000540
VCC GND T1OUT R1IN R1OUT T1IN T2IN R2OUT
C1+ V+ C1- C2+ C2- V- T2OUT R2IN
C2807 0.1
C2804 0.1
C2805 0.1
C2803 0.1
C4950 4700P
VZ4902 D4ED12710002
R2501 0
R2801 100
R2802 100
R491 2.2K
D6802 PH310
IR LED
R495 10M
D491 MA132WA
C492 0.47
Q491 2SD103 (AMP)
R492 330K
Q492 2SD1819A-R (AMP)
R494 1800
R493 4700
TO FRAME GND
RL4801
L4501 4.7u
D4501 B0BC6R100014
R4507 0
R4505 0
VZ4503 D4ED12710002
VZ4502 D4ED12710002
VZ4501 D4ED12710002
C4501 0.1
D4502 B0BC6R100014
C4502 6.3V22
D4503 B0BC6R100014
DV TERMINAL
JK4502
VJJ0568
G
TPB-
TPB+
TPA-
TPA+
G
A B C D E F G
1 2 3 4 5 6 7 8 9 10 11

NOTE:
DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NOTE:
THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS REC MODE.

NV-DS27,NV-DS28,NV-DS37,NV-DS38 FRONT SCHEMATIC DIAGRAM


F
E
D
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6
7
8
9
JK2501
JK4502
R2501
VZ4902
VZ4502
VZ4501
VZ4503
R2801
R2802
D2802
IC2801
C2805
C2803
C2807
C2804
C2810
R2808
R6402
C6401
C6402
C4907
C4950
LB4905
LB4906
TL6802
LB4901
R6803
FP4903
R4999
D4502
R4925
C4501
C4906
Q4907
C4913
Q4905
R4904
R4920
R4921
R4922
R4812
R4919
C4911
C4905
C4910
Q4906
JLA4901
JRA4901
JGA4901
R4927
RL4801
R4909
R4916
R4911
R4918
D6802
D491
R495
C492
R492
R494
R493
C491
R491
Q491
Q492
IR6401
D6803
D6804
C4502
L4501
D4503
D4501
R4507
R4505
D6801
R4810
C4804
Q4802
R4804
R4801
C4903
R4910
R4923
R4924
R4917
R4902
R4905
R4908
C4806
R4808
R4806
C4802
R4901
C4901
R4915
Q4902
Q4904
R4907
R4914
R4906
R4913
C4805
R4807
R4805
C4801
R4903
C4902
C4908
Q4901
Q4903
R4809
C4803
R4811
Q4801
R4803
R4802
R4912

(COMPONENT SIDE)

(FOIL SIDE)

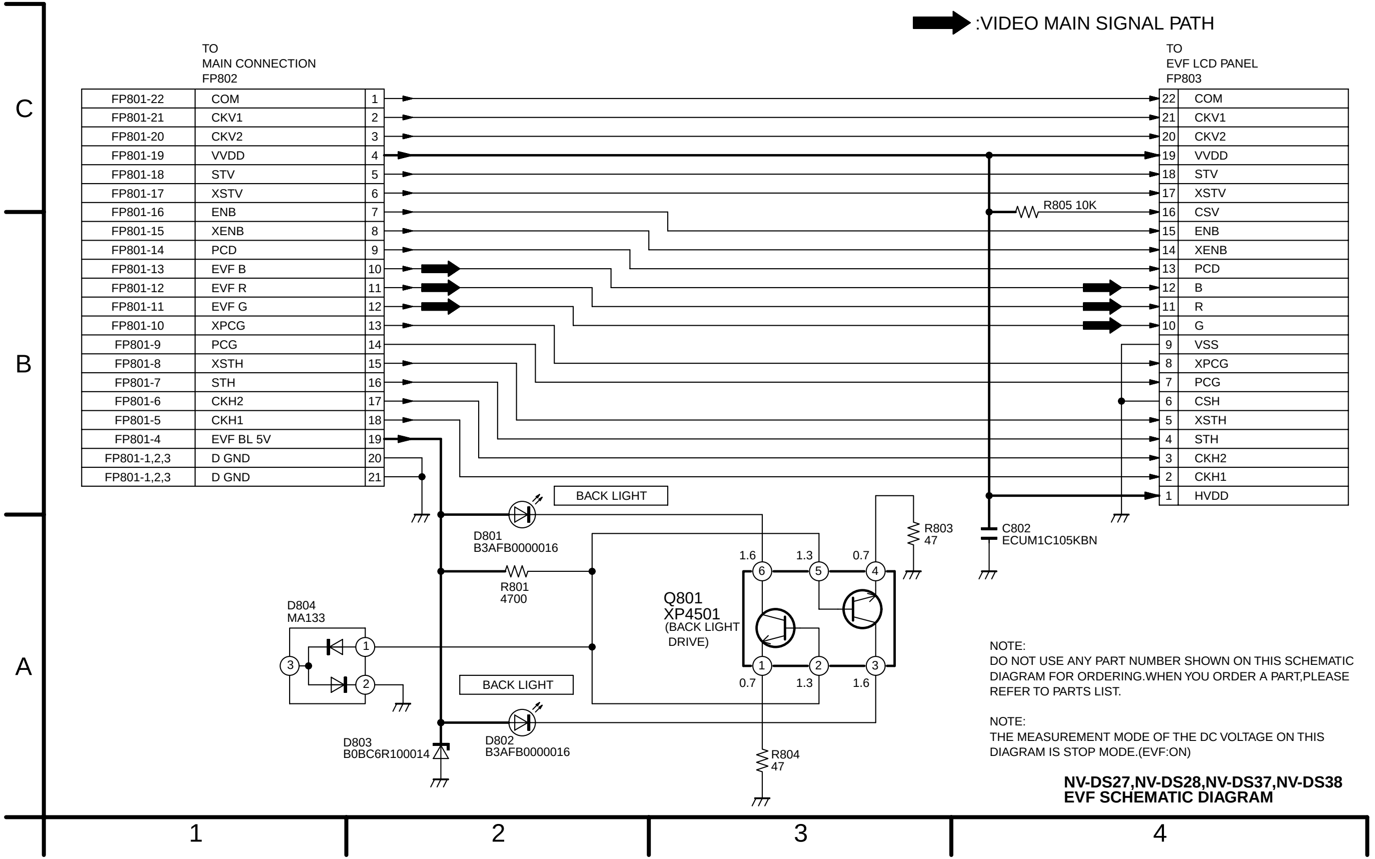
NV-DS27,NV-DS28,NV-DS37,NV-DS38
FRONT C.B.A.
VEP04773A

Front C.B.A.

Integrated Circuit	
IC2801	C-2
Transistor	
Q491	C-8
Q492	C-8
Q4801	A-7
Q4802	B-7
Q4901	A-8
Q4902	B-8
Q4903	A-9
Q4904	B-9
Q4905	B-2
Q4906	B-2
Q4907	B-1
Connector	
FP4903	B-1
Jack	
JK2501	D-4
JK4502	A-4
Test Point	
RL4801	A-1
TL6802	C-2
IR Reseiver	
IR6401	C-9
Diode	
D491	C-7
D2802	C-2
D4501	B-7
D4502	B-3
D4503	B-7
D6801	B-8
D6802	C-7
D6803	C-7
D6804	C-8
Coil	
L4501	B-7
LB4901	C-3
LB4905	C-3
LB4906	C-2
Absorber	
VZ4501	C-3
VZ4502	D-4
VZ4503	C-3
VZ4902	D-4
Capacitor	
C491	C-8
C492	C-8
C2803	C-3
C2804	C-3
C2805	C-3
C2807	C-3
C2810	C-2
C4501	B-4
C4502	B-7
C4801	A-7
C4802	B-7
C4803	A-7
C4804	B-7
C4805	A-7
C4806	B-7
C4901	B-7
C4902	A-7
C4903	B-8
C4905	B-3
C4906	B-4
C4907	C-3
C4908	A-8
C4910	A-3
C4911	B-3
C4913	B-1
C4950	C-8
C6401	C-1
C6402	C-1
Resistor	
R491	C-7
R492	C-8
R493	C-8
R494	C-8
R495	C-8
R2501	D-4
R2801	C-2
R2802	C-2
R2808	C-2
R4505	B-7
R4507	B-7
R4801	B-7
R4802	A-7
R4803	A-7
R4804	B-7
R4805	A-7
R4806	B-7
R4807	A-7
R4808	B-7
R4809	A-7
R4810	B-7
R4811	A-7
R4812	B-2
R4901	B-7
R4902	B-9
R4903	A-7
R4904	B-3
R4905	B-7
R4906	B-8
R4907	B-8
R4908	B-8
R4909	A-3
R4910	B-8
R4911	A-3
R4912	A-7
R4913	B-9
R4914	B-9
R4915	B-8
R4916	A-3
R4917	B-9
R4918	A-3
R4919	B-2
R4920	B-3
R4921	B-3
R4922	B-3
R4923	B-8
R4924	B-8
R4925	B-3
R4927	A-1
R4999	B-2
R6402	C-1
R6803	C-1
Jumper	
JGA4901	B-2
JLA490	B-2
JRA4901	B-2

ADDRESS INFORMATION

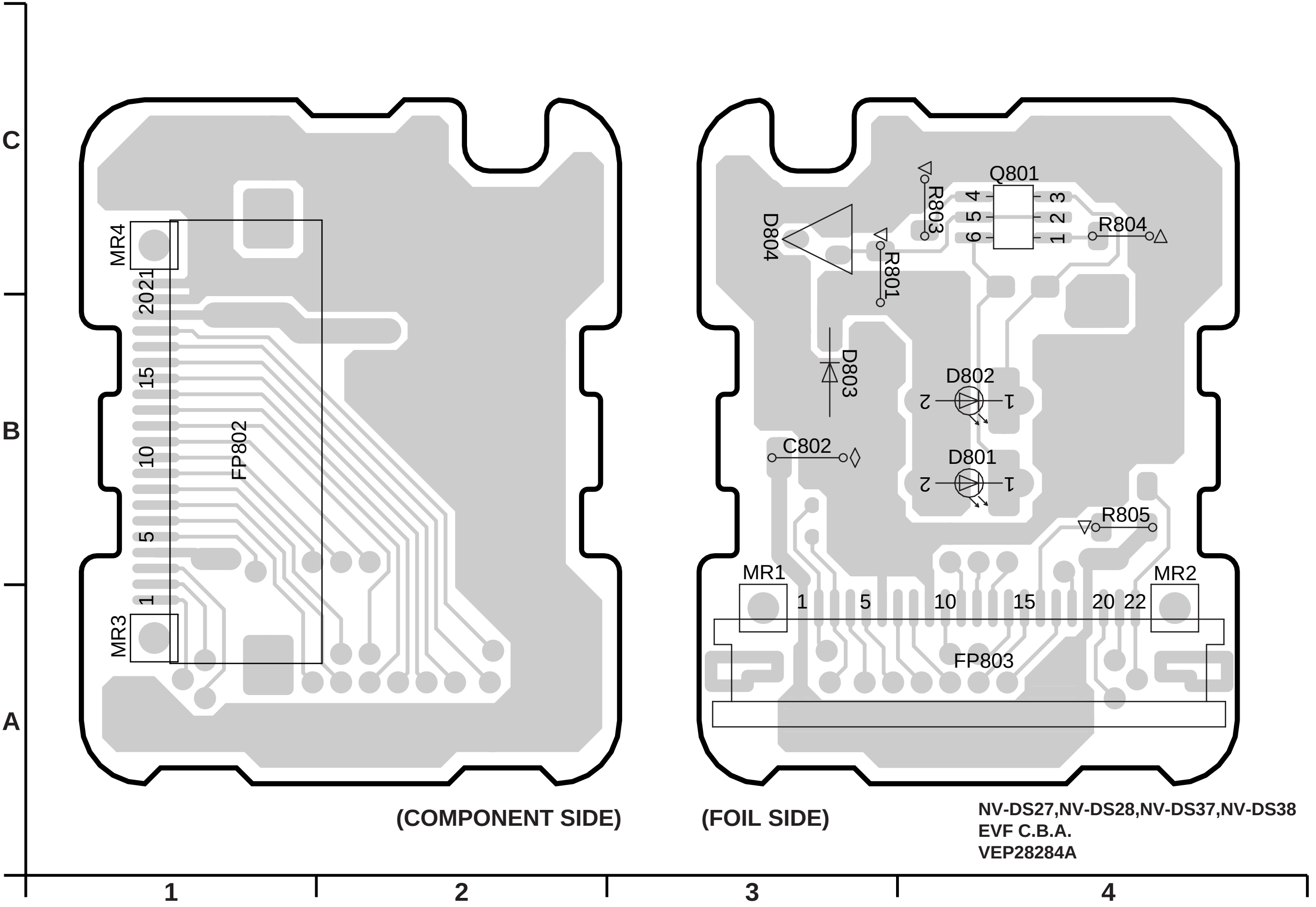
:VIDEO MAIN SIGNAL PATH


TO
MAIN CONNECTION
FP802
FP801-22 COM 1
FP801-21 CKV1 2
FP801-20 CKV2 3
FP801-19 VVDD 4
FP801-18 STV 5
FP801-17 XSTV 6
FP801-16 ENB 7
FP801-15 XENB 8
FP801-14 PCD 9
FP801-13 EVF B 10
FP801-12 EVF R 11
FP801-11 EVF G 12
FP801-10 XPCG 13
FP801-9 PCG 14
FP801-8 XSTH 15
FP801-7 STH 16
FP801-6 CKH2 17
FP801-5 CKH1 18
FP801-4 EVF BL 5V 19
FP801-1,2,3 D GND 20
FP801-1,2,3 D GND 21
TO
EVF LCD PANEL
FP803
22 COM
21 CKV1
20 CKV2
19 VVDD
18 STV
17 XSTV
16 CSV
15 ENB
14 XENB
13 PCD
12 B
11 R
10 G
9 VSS
8 XPCG
7 PCG
6 CSH
5 XSTH
4 STH
3 CKH2
2 CKH1
1 HVDD
R805 10K
C802
ECUM1C105KBN
R803
47
BACK LIGHT
D801
B3AFB0000016
R801
4700
Q801
XP4501
(BACK LIGHT
DRIVE)
1.6
1.3
0.7
6
5
4
1
2
3
0.7
1.3
1.6
D804
MA133
3
1
2
BACK LIGHT
D803
B0BC6R100014
D802
B3AFB0000016
R804
47
C
B
A
1
2
3
4

NOTE:
DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NOTE:
THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.(EVF:ON)

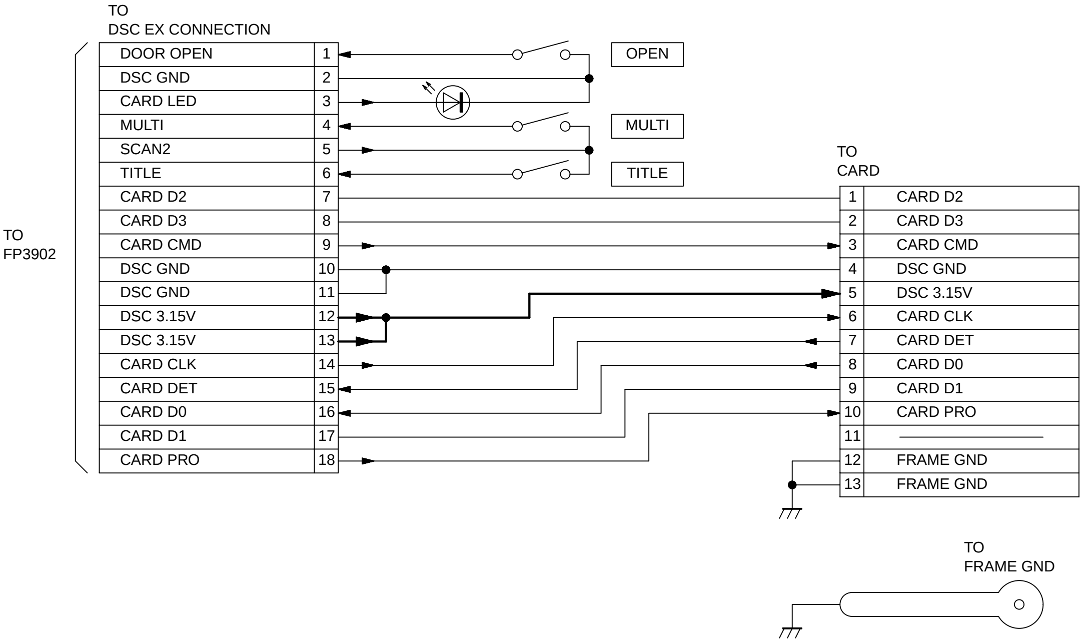
NV-DS27,NV-DS28,NV-DS37,NV-DS38
EVF SCHEMATIC DIAGRAM


C
B
A
1
2
3
4
MR4
20
21
15
10
5
1
FP802
MR3
D804
R803
Q801
4
5
6
3
2
1
R804
R801
D803
D802
2
1
C802
D801
2
1
R805
MR1
MR2
1
5
10
15
20
22
FP803

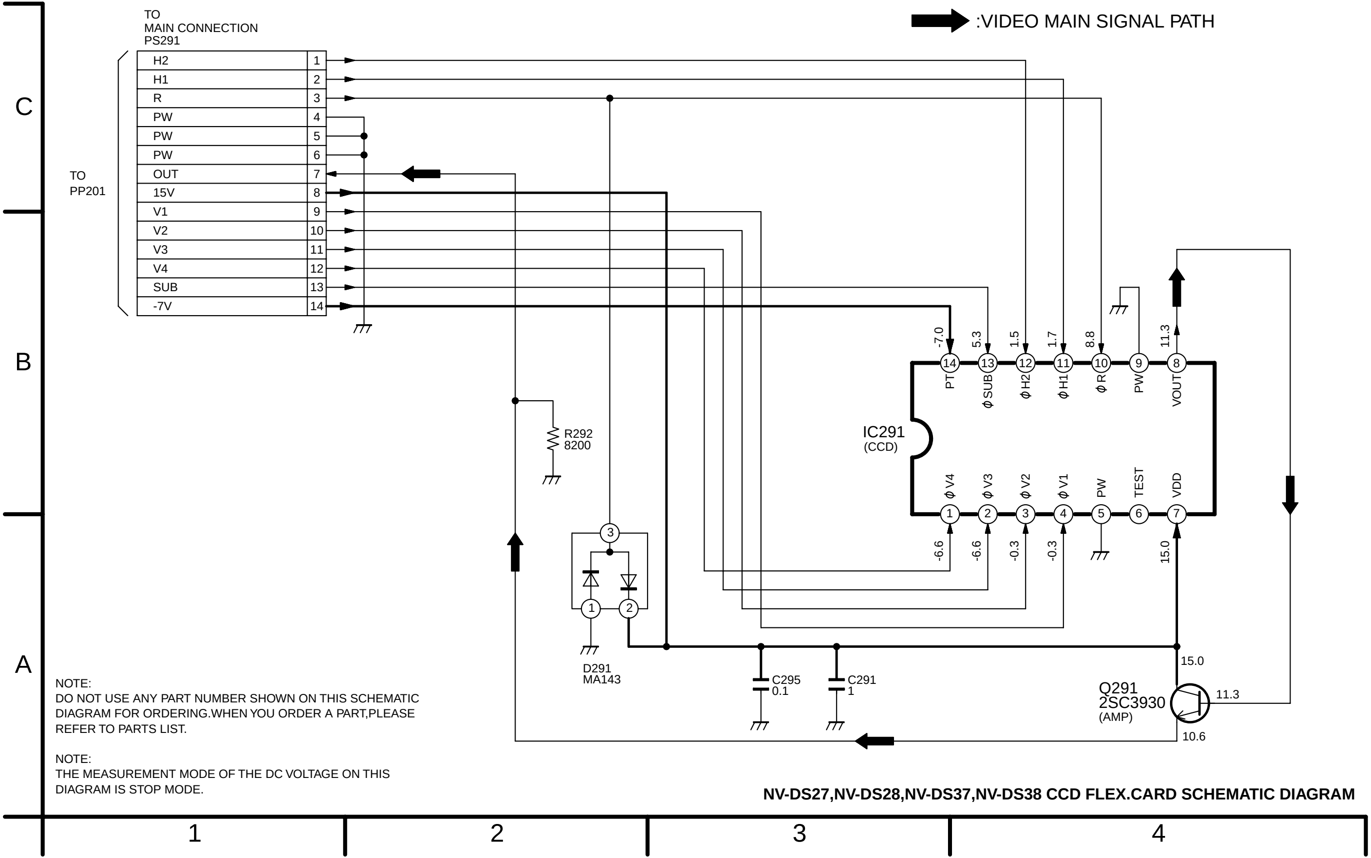
(COMPONENT SIDE)

(FOIL SIDE)

NV-DS27,NV-DS28,NV-DS37,NV-DS38
EVF C.B.A.
VEP28284A


TO
DSC EX CONNECTION
DOOR OPEN 1
DSC GND 2
CARD LED 3
MULTI 4
SCAN2 5
TITLE 6
CARD D2 7
CARD D3 8
CARD CMD 9
DSC GND 10
DSC GND 11
DSC 3.15V 12
DSC 3.15V 13
CARD CLK 14
CARD DET 15
CARD D0 16
CARD D1 17
CARD PRO 18
TO
FP3902
OPEN
MULTI
TITLE
TO
CARD
1 CARD D2
2 CARD D3
3 CARD CMD
4 DSC GND
5 DSC 3.15V
6 CARD CLK
7 CARD DET
8 CARD D0
9 CARD D1
10 CARD PRO
11
12 FRAME GND
13 FRAME GND
TO
FRAME GND
B
A
1
2
3

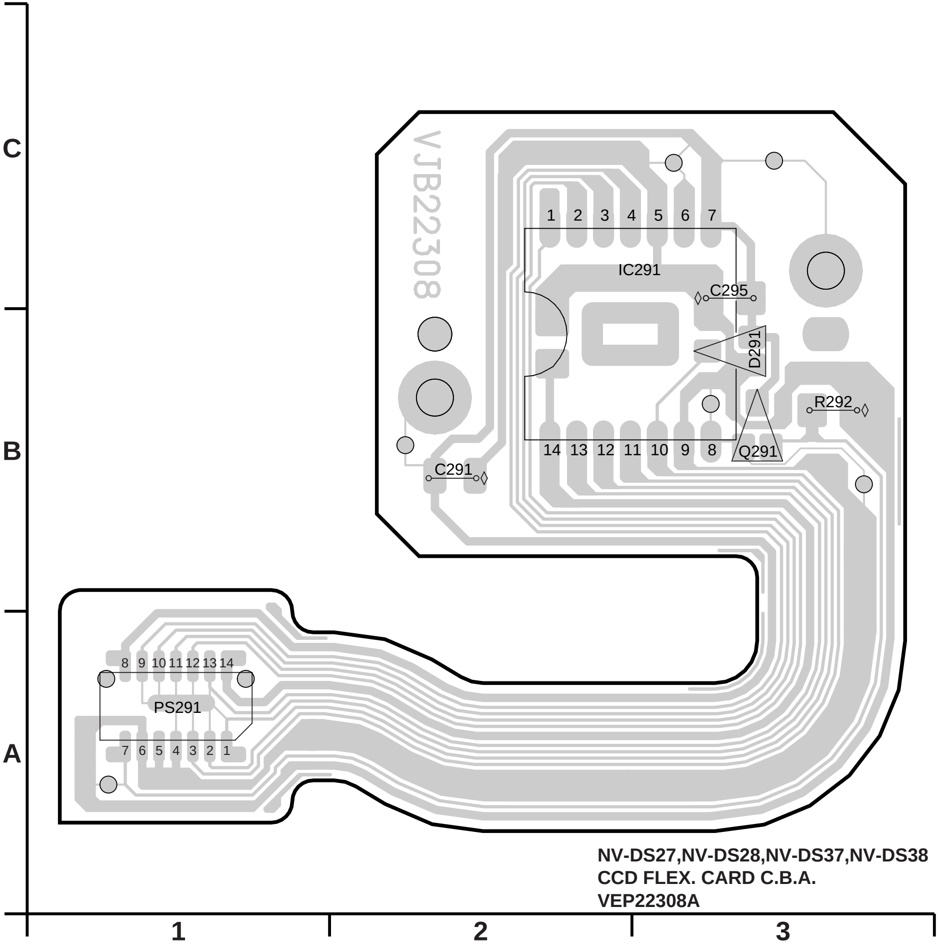
NV-DS27,NV-DS28,NV-DS37,NV-DS38
SIDE CASE R UNIT(DSC FLEX.)SCHEMATIC DIAGRAM(NV-DS37,NV-DS38 ONLY)


:VIDEO MAIN SIGNAL PATH
TO
MAIN CONNECTION
PS291
TO
PP201
H2 1
H1 2
R 3
PW 4
PW 5
PW 6
OUT 7
15V 8
V1 9
V2 10
V3 11
V4 12
SUB 13
-7V 14
R292
8200
D291
MA143
C295
0.1
C291
1
IC291
(CCD)
PT 14 -7.0
ϕSUB 13 5.3
ϕH2 12 1.5
ϕH1 11 1.7
ϕR 10 8.8
PW 9
VOUT 8 11.3
ϕV4 1 -6.6
ϕV3 2 -6.6
ϕV2 3 -0.3
ϕV1 4 -0.3
PW 5
TEST 6
VDD 7 15.0
Q291
2SC3930
(AMP)
15.0
11.3
10.6
C
B
A
1
2
3
4

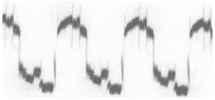
NOTE:
DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NOTE:
THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

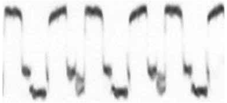
NV-DS27,NV-DS28,NV-DS37,NV-DS38 CCD FLEX.CARD SCHEMATIC DIAGRAM


C
B
A
1
2
3
VJB22308
1 2 3 4 5 6 7
IC291
C295
D291
14 13 12 11 10 9 8
Q291
R292
C291
8 9 10 11 12 13 14
PS291
7 6 5 4 3 2 1

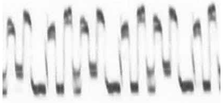
NV-DS27,NV-DS28,NV-DS37,NV-DS38
CCD FLEX. CARD C.B.A.
VEP22308A



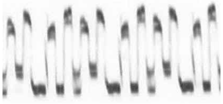
FP801-11 REC/PLAY
0.7Vp-p (20 μ sec./div.)
COLOUR BAR



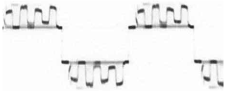
FP801-12 REC/PLAY
0.7Vp-p (20 μ sec./div.)
COLOUR BAR



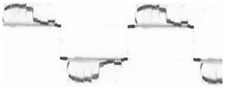
FP801-13 REC/PLAY
0.8Vp-p (20 μ sec./div.)
COLOUR BAR



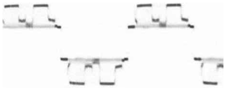
IC901-1 REC/PLAY
0.8Vp-p (20 μ sec./div.)
COLOUR BAR



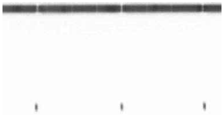
IC901-4 REC/PLAY
4.4Vp-p (20usec./div.)
COLOUR BAR



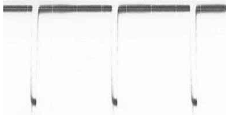
IC901-6 REC/PLAY
4.0Vp-p (20 μ sec./div.)
COLOUR BAR



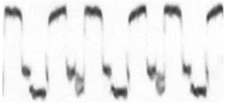
IC901-8 REC/PLAY
4.2Vp-p (20 μ sec./div.)
COLOUR BAR



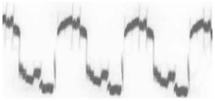
IC901-45 REC/PLAY
2.4Vp-p (5msec./div.)



IC901-46 REC/PLAY
2.4Vp-p (20usec./div.)



IC901-47 REC/PLAY
0.7Vp-p (20 μ sec./div.)
COLOUR BAR



IC901-48 REC/PLAY
0.7Vp-p (20 μ sec./div.)
COLOUR BAR

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	VMODE	NTSC/PAL Select Switch			
	VMVH	VH Filter Switching			
	VORP	Video Overlap			
	VRB	Voltage Refference Bottom			
	VRBS	Voltage Refference Bottom Output			
	VREF1R3V	Refference Voltage 1.3V			
	VREF3R3V	Refference Voltage 3.3V			
	VREFH	Refference Voltage High Side			
	VREFL	Refference Voltage Low Side			
	VRI	Refference Voltage Input			
	VRO	Refference Voltage Output			
	VRT	Voltage Refference Top			
	VRTS	Voltage Refference Top Output			
	VS	Switching Comparator			
	VSS	Vertical Sync Signal			
	VSSX	X Driver Power for Colour LCD			
	VSSXY	X-Y Driver Power for Colour LCD			
W	W/N	Mode Select for Window Mode			
	W/N	Wide / Normal			
	WAD	Write Address Enable			
	WAE	Write Address Enable			
	WAERAE	Write Address Enable			
	WARI	Interrupt			
	WB	White Balance			
	WE	Write Enable			
	WEM	Memory Write Enable			
	WHD	Wide Horizontal Drive Pulse			
	WIDE A	Wide Zoom			
	WSB	B AGC Control			
	WSR	R AGC Control			
	WTV	Wide TV			
X	XP	FG Logic Reset			
Y	Y FM0-7	Y Field Memory 0-7			
	YCE	Cylinder Error Code			
	YGC	Y Gain Control			
	YMO 0-7	Y Field Memory 0-7			
	YNCST	Noize Canceller			
	YNR	Luminance Noise Reduction			
	YSDP 0-7	Digital Y Out 0-7			
Z	Z.ENC	Zoom Encoder			
	Z.MIC	Zoom Mic			
	ZENC	Zoom Encoder Output			
	ZMDIR	Zoom Drive			
	ZMEN	Zoom Enable			
	ZMT	Zoom Motor Tele Side			
	ZMT (+)/(–)	Zoom Motor (+)/(–)			
	ZMTER	Zoom Motor Tele Side			
	ZMW	Zoom Motor Wide Side			
	ZSW	Zoom Switch			

INITIAL/LOGO		ABBREVIATIONS
	RENCF	Lens Control (Forward)
	RENCR	Lens Control (Reverse)
	RERASE	Rotary Erase Head
	RGBIV1-2	1V Inverted Signal 1-2
	RGO R/G OFF	Offset Voltage for AWT R
	RSF	Capstan Direction (Reverse / Stop / Forward)
	RST	Reset
	RSTB	R Strobe
	RSTPWD	Reset Power Down Input
	RSTR	Reset Read
	RSTW	Reset Write
	RT	Saw Tooth Terminal
	RVCO	Resister for Oscillation
	RW	Read Write
	RWAE	Read Write Enable
S	S PHOT	Supply Photo Transistor
	S/H	Sampling Hold
	S/S	Start/Stop
	SBD	Serial Data
	SBI	Serial Data Input
	SBO	Serial Data Output
	SBT	Serial Clock
	SCAN0-5	Key Scan 0-5
	SCK	Serial Clock
	SCR	Search
	SCR, S.C.R.	Still Cue Review
	SEG.	Segment
	SET	White Balance Set
	SH/IRIS	Shutter/Iris Control
	SHIFT	Capasitor for Phase Shift
	SI	Serial Data Input
	SIC	Shift In Clock Input
	SIOC	Serial In/Out Control
	SMCE	Shaffling Memory Chip Enable
	SMRS	Shaffling Memory Read Strobe
	SMWE	Shaffling Memory Write Enable
	SMWS	Shaffling Memory Read Strobe
	SNAP	Snap Shot
	SNS LED	Sensor LED
	SO	Serial Data Output
	SPA	ATF Smapling Pulse
	SPEN	8 Bit Shift Register Enable
	SPK	Speaker
	SPO	Reset for Switcing Power
	SPST	8 Bit Shift Register Strobe
	SREELP	Supply Reel Pulse
	SRT	Start
	SSA	Start Sync block Area
	SSW	Select Signal for Low Pass Filter
	ST5V	Safety Tab 5V
	STAB	Safety Tab Switch
	STB	Stand by Signal
	STB	Strobe
	SWB	Switching Pre-Drive Pulse
	SYL EC	Cylinder Torque Control
	SYL FG	Cylinder FG
T	T PHOT	Take-up Photo Transistor
	TBC	Time Base Conntrol
	TFT	Thim Film Transistor
	TH	Thermostat for Battery
	TI	Test Mode Select
	TL	Torque Limit
	TM	Sub Code
	TMD	Sub Code Data
	TRE	Tracking Error Signal
	TREEL(P)	Take-up Reel (Pulse)
	TRFIX	Tracking Fix
	TRIWAVE	Tracking Wave
	TRP	Tracking Position
	TRP	Trap
	TSR	Head Switching Refference
	TST	Time Scale Transfer
U	U/V SEL	R-Y/B-Y Select Signal
	UNLOAD	Un-Loading
	UNRE	Microprocessor Read Enable
	UNWE	Microprocessor Write Enable
	UV	R-Y/B-Y
	UV SEL	R-Y/B-Y Select Signal
V	V1-V4	V. CCD Drive Pulse
	VB	VH Filter Switching
	VCE	Power Terminal
	VCNTL	Video Control
	VCO	Voltage Control Oscillator
	VCP	Shift Clock Output for Vertical Drive
	VCTLD	Video Control
	VCTRL	Voltage Charge Control
	VD	Vertical Drive Pulse
	VDDX	X Drive Power for Colour LCD
	VDDXY	XY Drive Power for Colour LCD
	VDDY	Y Drive Power for Colour LCD
	VDREC	Video Delayed Rec
	Vgg	Voltage for Gate IC
	Vgl	Gate off Voltage
	VID	Video Signal Out
	VIN	Video In
	VITC	Vertical Interval Time Code
	VITERBI	One of Signal Detection Method
	VL	Low Voltage
	VLC	Variable Length Cording
	VLOCKP	Artificial Sync Pulse
	VLP	Artificial Sync Pulse
	VM	Motor Voltage
	VMD	Velocity Mode Data
	VMD1-3	Electric Shutter Mode

INITIAL/LOGO		ABBREVIATIONS
	LVL	LPF Switch for Auto Focus
M	M1-3	Motor Coil Terminal 1 to 3
	MA0-5	Microprocessor Address Data 0-5
	Mbps	Megahertz Bit Per Second
	MD	Modulation
	MD0-7	Microprocessor Data 0-7
	MDT0-7	Microprocessor Data 0-7
	ME (TAPE)	Metal Evaporated (Tape)
	MENB	Focus Motor Enable
	MFF	Manual Focus Far
	MFN	Manual Focus Near
	MHSYNC	Monitor Horizontal Sync Signal
	MIC	Memory In Cassette
	MIG	Meta In Gap
	MIX N.R.D.	Non Rec Data Mix
	MOD	Modulation
	MOUT	Mic Out
	MP (TAPE)	Metal Particle (Tape)
	MPEG	Moving Picture Image Cording Experts Group
	MPEG2	Moving Picture Image Cording Experts Group Phase 2
	MRST	Focus Motor Reset
	MSB	Most Signal Bit
	MVSYNC	Monitor Vertical Sync Signal
N	N/F	Near/Far Focus
	N/P	NTSC/PAL
	NB1-3	Base for NPN Transistor
	NC	No Connection
	NC1-3	Corrector of NPN Transistor
	NCLR	Power On Reset
	NCP1	Clamp Pulse
	NCP2+VDH	Clamp Pulse + Horizontal Drive Pulse
	NCP2+VDM	Clamp Pulse + Gate Pulse
	NDE	Non Liner De-Emphasis
	NE	Emitor of NPN Transistor
	NLE	Non Liner Emphasis
	NR	Noise Reduction
	NRD	Non Rec Data
	NRD BLK	Non Rec Data Blanking
	NRD CLK	No Rec Data Clock
	NRE	Read Enable Input (Low Active)
	NWE	Write Enable (Low Active)
O	OB	Optical Black
	OBCNT	Optical Black Control
	OBREF	Reference Voltage for Optical Black Control
	OE	Output Enable
	OFH	Horizontal Counted Down Clock Signal (Reference)
	OFS	Offset
	OP	Operation AMP Output
	OSD	ON Screen Display
	OVL	Overlap Pulse
	OZ	Optical Zoom
P	P SW	Power Switch
	PB1-3	PNP Base 1-3
	PBCTL	Play Back Control
	PBCTL	Pre-Branking Control
	PBH	Head Amp Switch
	PBLK	Pre-Blanking (Pulse)
	PC1-3	Corrector of PNP Transistor
	PCBM	Carrier Balance
	PCH	Phase Compensator (Hall AMP)
	PCI	Phase Compensator (Current)
	PCO	Phase Compensator Out
	PCS	Switching Power Control
	PCV	Phase Compensator (Voltage)
	PE	Emitter of PNP Transistor
	PED	Pedestal
	PEDECNT	Pedestal Control
	PENO	Alarm (L)
	PFP	Pilot Frame Position
	PGA, B	Power Ground A, B
	PGC	Pulse Generator Comparator
	PGI	Pulse Generator Input
	PGMM	Pulse Generator Monostable Multivibrator
	PGO	Output of Pulse Generator AMP
	PMODE	Select Signal for Normal / Wide Screen
	PON	Power On
	POR	Power On Reset
	POSCOM	Common Position
	PREAMP	Pre-AMP
	PREBLK	Pre-Blanking
	PT	Protect for V Voltage
	PWM	Pulse Width Modulation
	PWMB	Pulse Width Modulation Pulse
Q	Q2H	Source Output Select
R	R CTL P	Recorded Control Pulse (+)
	R CTL R	Recorded Control Pulse (–)
	R/B	Read/Busy
	R/L	Direction Control for Data Transmition
	RA	Recording AMP
	RA1	Rec AMP 1
	RAC AC	Rec Audio Current
	RAD	Read Address Data
	RAE	Read Address Enable
	RB	Read Busy
	R-B	R Bias
	RCB	R Carrier Balance
	RE	Read Enable
	RE(F), (S)	Rotary Erase Head Transformer
	REB	R Bias
	REC CC	Rec Current Control
	REC CCNT	Rec Current Control
	RECCTRL	Recording Control Pulse
	RECI	Rec Amp Switch

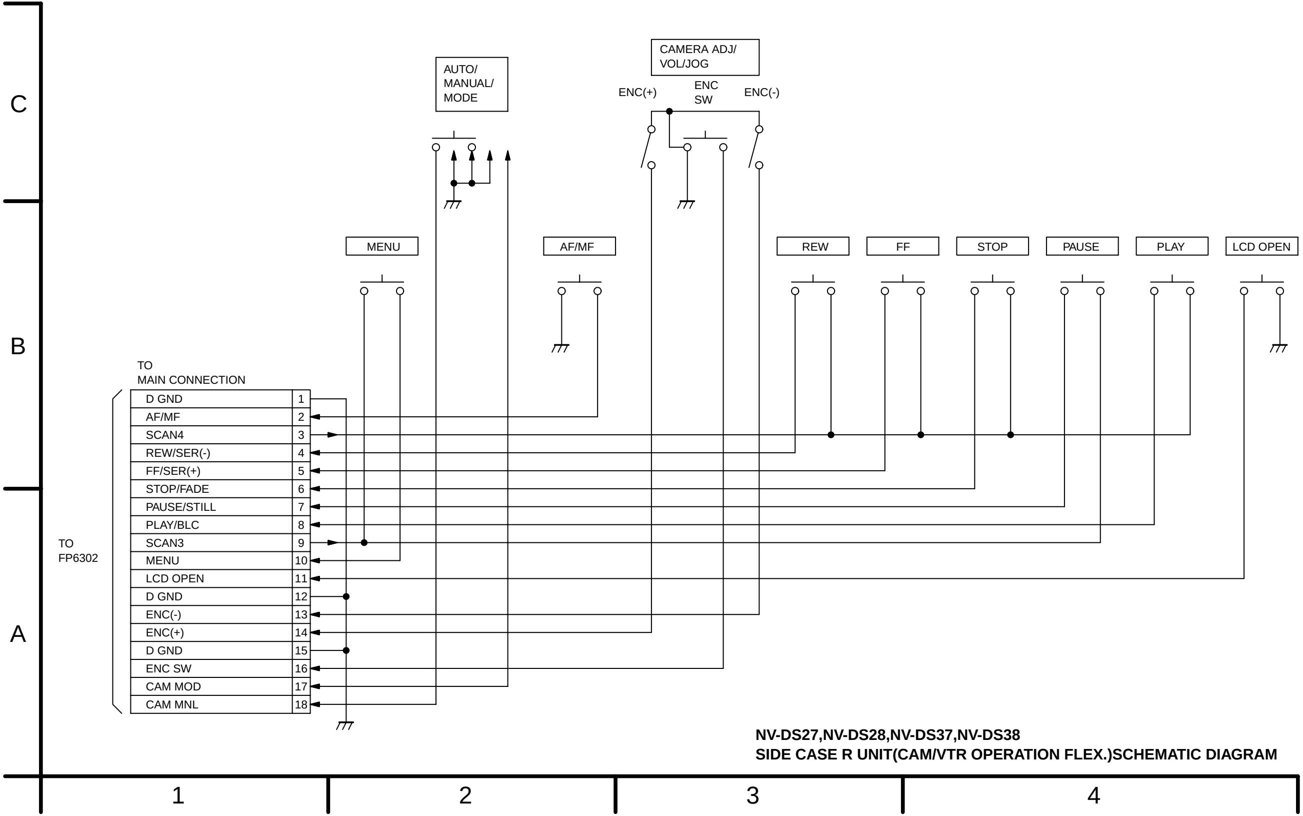
INITIAL/LOGO		ABBREVIATIONS
	EQ	Equalizer
	EVF	Electric View Finder
	EXT DC	External DC (AC Adaptor)
	EXT DC(H)	AC Adaptor DC (H)
	EXT NOREG	AC Adaptor 6V
	EXT S DATA	Serial Data for Edit
	EXT SCK	Serial Clock for Edit
	EZOOM	Electric Zoom
F	F ENC	Lens F-Value
	FACT MODE	Factry Mode (not used in the service)
	FB	Feed Back
	FC	Saw Tooth Signal In
	FCK	Clock
	FCO	Saw Tooth Signal Generator
	FENC	Focus Encoder
	FEND	Frame End Pulse
	FH2B	FH/2 (15.625KHz / 2=7.8125KHz)
	FIX OSD	Auto Tracking Off (H)
	FLICK	Flicker Output
	FM	Field Memory
	FM0-7	Field Memory 0-7
	FMCO0-3	Field Memory Chrominance Out 0-4
	FMDIR	Focus Motor Direction
	FMOEM	Field Memory Enable
	FMOEO	Field Memory Enable
	FMT1-4	Focus Motor Terminal 1-4
	FMY00-07	Field Memory Luminance Out 0-7
	FMYI0-07	Field Memory Luminance In 0-7
	FNO	F Value
	FPS	Frame Refference Signal
	FR	Capstan Reverse High
	FRP	Frame Refference Pulse
	FRPSO	Frame Start Pulse
G	G1, G2, G3	Gap 1, 2 and 3
	GCA	Gain Control AMP
	GCNT	Gain Control
	G-CNT	AGC Adjustment
	GCTRL	Gain Control
	GENE	Generator
	GF	FG AMP Terminal
	GSW	Ground for Switching Power
H	H/M/N	Hi-Fi / Mix / Normal
	H/N	Hi-Fi / Normal
	H1, 2	H. CCD Drive Pulse
	HAP	Horizontal Aperture
	HASW	Head AMP Switching Pulse
	HB	Hall Bias
	HBR SET	High Brightness Set
	HBRST	High Brightness Set
	HCLR	High Clear
	HCP	Shift Clock for Horizontal Drive
	HD	Horizontal Drive Pulse
	HDTV	High Definition TV
	HEX	Hexadecimal
	HG	Hall Gain
	HID	Head Switching Pulse
	HLT	High Bright Signal
	HALL IN(+), (–)	Input Signal from Hall IC
	HP	Headphone
	HPF	High Pass Filter
	HSE	Modulated Data Output
	HSP	Timing Pulse for Shaffling Memory
	HSS	Horizontal Sync Signal
	HSW	Head Switching Pulse
	HS-WT	High Speed Zoom
	HSZ	High Speed Zoom
I	I/F	Interface
	I-2 C	Inter Integrated Circuit
	ID(H)	Wide Television (H)
	IMP	Inter Microprocessor Protocol
	INF	CCD Input Signal 1
	INF	Input Frame Signal
	INS	CCD Input SIgnal 2
	INTER	Interval Recording
	INV	Inverter
	IOU	R-Y Analogue Signal Output
	IOV	B-Y Analogue Signal Output
	IOY	Y Analogue Signal Output
	IR	Infrared Rays
	IRDET	Imfrared Ray Detection
	IREF	Current Adjustment Terminal
	IRIS/SH	Iris / Shutter Control
	IRQ	Interrupt Request
	ITI	Insert & Track Information
J	JPEG	Joint Photographic Image Cording Experts Group
K	KANDO	Digital Gain Up
	KB	Carrier Balance
	KEY IN	Key Scan
	KND	Digital Gain Up
	KNEE	Luminance Compensate
L	LCD	Liquid Crystal Display
	LCD P(L)	LCD Power On (L)
	LD	Load Pulse
	LDD	Liquid Direct Drive
	LEDCNT	LED Control
	LI-BATT	Lithium Battery
	LOAD	Loading
	LOAD F, R	Loading Direction (F: Forward / R: Reverse)
	LPF	Low Pass Filter
	LRMONO	Monoral Audio (L + R)
	LSB	Least Significant Bit

INITIAL/LOGO		ABBREVIATIONS
	CRA	Pre Apature Gain Control
	CRST	Camera Reset
	CS	Chip Select
	CS 0-7	Chrominance Signal Out 0-7
	CSEL	Clock Phase Select
	CSI 0-7	Chrominance Signal In 0-7
	CTSW	Crosstalk Switch
	CURR	Current
	CW	Clockwise
	CYL EC	Cylinder Motor Trque Control
	CYL PG	Cylinder Motor PG
	CYL VM	Cylinder Motor Current or Power
D	D CLK	Digital Clock
	D MODE	Digital Mode Switch Signal
	D01-03	Zoom 01-03
	DA UV SEL	D/A Convertor U/V Select
	DAC	Digital Analogue Converter
	DAG	Digital Analogue Ground
	DB0-7	Data 0-7
	DB0-7	Microprocessor Data
	DCC	DC Clamp Control
	DCCNT	DC Control
	DCI	Digital Channel Cording IC
	DCLR	Digital Clear
	DCP	Digital Clamp Pulse
	DCS-CLK, DA	CAS & DV I/F Serial Clock
	DC-STP1	DCS Serial Start
	DC-STP2	DCS Serial Stop
	DCT	Discrete Cosine Transform (Compression)
	DCX7	Serial Data
	DEDP 0-3	Playback Data
	DEDR 0-3	Rec Data
	DEMO	Demodulation
	DEMP	A/D Convertor Empahsis Control
	DEMP	De-Emphasis
	DFD 0-7	Encode Data In/Out Between Shaffling Memory
	DFD0-7	Encode Input/Output Signal for Shuffling Memory
	DIBDCK	Bit Clock
	DICLK	Digital Clock
	DIDAT	Serial Data
	DIDAT	Serial Data Durring Digital Audio In
	DIF	Digital Interface
	DILRCK	L/R Clock
	DILRCK	Serial Clock Durring Digital Audio In
	DIMCK	Master Clock
	DIMCK	Mater Clock Durring Digital Audio In
	DIO 1-8	Data In/Out
	DIOS	Data In/Out Select Control Signal
	DIOS	Select Signal for Digital In/Out
	DIS	Digital Image Stabilizer
	DIS R/B	Digital Image Stabilizer Read (H)/Busy (L)
	DIS R/B	DIS IC Rady/Busy
	DIS/KAND	Digital Image Stabilizer/Sensitivity

INITIAL/LOGO		ABBREVIATIONS
	DISCS	Dis Chip Select
	DISP	Display
	DL	Delay Line
	DOBCK	Audio A/D Convertor Bit Clock
	DOCTL	Data Output Control Signal
	DODAT	Serial Data (to D/A Converter)
	DOLRCK	Audio A/D Converter LR Clock
	DOLRCK	L/R Clock (to D/A Converter)
	DOMCK	Audio A/D Converter Master Clock
	DOMCK	Master Clock (to D/A Converter)
	DQ 1-16	Memory Data
	DRAM CAS	D-RAM Colum Address Strobe
	DRAM OE	D-RAM Out Enable
	DRAM RAS	D-RAM Read Address Strobe
	DREC	AV Delayed REC Start Pulse
	DRK	Dark (LPF Switch for Auto Focus)
	DS1, 2	Double Sampling Pulse
	DSF 0-7	Data In/Out for Shaffling Memory
	DSF 0-7	Input/Output Data to Shuffling Memory (18MHz)
	DSP	Digital Signal Processor
	DSP R/B	DSP IC Rady/Busy
	DSP-48K-H	DSP IC Clock Select
	DSTB	Data Stobe Signal
	DSV	Digital Sum Variation
	DV	Digital Video
	DVB	Digital Video Broadcast
	DVC	Digital Video Cassette
	DVDD	Digital VDD
	DVIO	Digital Video Input Output
	DVSS	Digital Ground
	DX	Shift Data for X Direction (for LCD)
	DY	Shift Data for Y Direction (for LCD)
	DY	TFT Y-axis Shift Data
	DZ	Digital Zoom
E	E Snap	Electric Snap Shot
	E ZM	Electric Zoom
	E2 CS or E2P CS	EEPROM Chip Select
	E2 R/B	EEPROM Rady/Busy
	E2P	EEPROM
	EARP	Earphone
	EC	Torque Control
	ECC	Error Correction Cording
	ECM	Electric Condencer Mic
	ECR	Reference Voltage for Capstan Torque
	EDA	Error Correction, DCI, ATF Servo
	EE CS	EEPROM Chip Select
	EE R/B	EEPROM Read (H)/Busy (L)
	EEPROM	Electric Erasable Programable Read Only Memory
	EIS	Electric Image Stabilizer (DIS)
	EMP	A/D Convertor Emphasis Control
	ENAB	Enable
	ENV	Enverope
	EOB	End of Block

INITIAL/LOGO		ABBREVIATIONS
	BLKZ	Blanking Pulse for Zoom Encorder
	BM	Balance Modulator
	BQUIET	Bus Out Control Signal
	BUF IN/OUT	Buffer In/Out
	B-Y KB	B-Y Carrier Balance
	B-YO	B-Y Signal Out
C	C A In/Out	Pre-Aperture In/Out
	CAPSTP	Capstan Stop Flag
	C CNT	Colour Control
	C SYNC	Composite Sync Signal
	C/N	Carrier/Noise
	C0-7, C00-07	Chrominance Signal 0-7
	CAGAIN	Aperture Gain Control
	CAM	Camera
	CAM CLK	Camera Clock
	CAM RST	Camera Reset
	CAM SIOC	Camera Serial In/Out Contol
	CAM T	Camera Test
	CAM TL	Capstan Trque Limit
	CAP EC	Capstan Trque Control
	CAP P(H)	Capstan Power On (H)
	CAP R/F/S	Capstan Reverse (H)/Stop (M)/Forward (L)
	CAP SW	Capstan Power Control Switch
	CAPSTP H	Capstan Stop Flag (Stop High)
	CAPVM	Capstan Motor Current
	CAPVS	Capstan Motor Power Control Switch
	CAS	Compresion, Audio Process, Shuffling/Deshuffling
	CAS	Memory Address Strobe (Active Low)
	CASDOWN, DWN	Cassette Down (L)
	CB, CR	Chroma B, Chroma R
	CBLK	Composite Blanking Pulse
	CC	Channel Cording
	CCA	Curent Drive Control
	CCA	Current Control Amp
	CCD	Charge Coupled Devise
	CCW	Counterclockwise
	CD SP0-7	Digital Chroma
	CDS	Correlate Double Sampling Signal
	CDS1, 2	Sampling Pulse for CCD Output Signal
	CE	Chip Enable
	CE	Control Pulse Erase
	CEC	Capstan Error Code
	C-ERA(H)	Control Erase (H)
	CFEM	Chrominance Memory Signal
	CFM	Chrominance Field Memory
	CFM1-4	Chroma Field Memory Signal
	CG CLK	Character Generator Clock
	CG CLK DATA	Clock Generator Data
	CG DATA	Character Generator Data
	CGC	Chrominance Gain Control
	CGCS	Character Generator Chip Select
	CGO	Character Generator Serial Data
	CH	Charge
	CH1	Channel 1 (Odd Field)
	CHR	Character
	CHR BACK	Character Back-up
	CHR MIX	Character Mix
	CI, CO	Buffer In/Out
	CI,CO	Buffer Input & Output
	CIF	Control Signal Forward Input
	CIF, CIR	Positive Control Pulse, Negative Control Pulse
	CIR	Control Signal Reverse Input
	CK	Clock
	CL/CLK	Clock
	CLASS	Classeffication Signal for Compress (DCT/VLC)
	CLASS 0.1	Class Control Signal Durring DCT/VLC
	CLK135	13.5MHz System Clock
	CLK18	18MHz System Clock
	CLK2	Clock 2 (824XFH: 12.875MHz)
	CLK246	24.576MHz Clock
	CLK27	27MHz System Clock
	CLK450	450KHz Clock
	CLKDCLK	Digital Clock
	CLK-PH	Clock Phase Control
	CLK-REF	Reference Clock
	CLP-RST-H	Clamp Reset High Signal
	CLX	TFT X-axis Transmission Clock
	CLX, CLX1-4	Shift Clock for X Direction (LCD Panel)
	CLY	Shift Clock for Y Direction (LCD Panel)
	CLY	TFT Y-axis Transmission Clock
	CLY FG	Cylinder FG Signal
	CMEMO0-3	Chroma Memory Output Signal 0-3
	CMIX	Character Mix
	CMO	Chrominance Memory Output
	COMPC	Position Detection Pulse
	COM RDY	Serial Enable Signal
	CMODE	Camera Mode
	CNCLK	Clock
	CNR	Chrominance Noise Reduction
	CNT, CONT	Control
	CO	Control Out
	CO0-7	Chrominance Output 0 to 7 (Digital)
	COM	Common
	COM RDY	Serial Transmission Enable
	COMB	Comb Filter
	COS EQ	Cosin Equalizer
	CP	Clamp Pulse
	CP ON(H)	Camera Power On(H)
	CP2, 20	Clamp Pulse
	CP2A, CP2O	Encoder Clamp Pulse
	CPN	Component Signal
	CPOB	Clamp Pulse for Optical Blanking
	CPS	Composite Signal
	CPV	Gate Scan Clock
	CR OUT	Pre Apature Out
	CR POW SW	Camera Remote Power On Switch
	CRA	Aperture Gain Control

INITIAL/LOGO		ABBREVIATIONS
A	A GND	Analogue GND
	A HASW	Audio Head Amp Switching Pulse
	A HSW	Audio Switching Pulse
	A MUTE	Audio Mute
	A ORP	Audio Overlap Pulse
	A. TR	Auto Tracking
	A0-8, 0-17	Memory Address
	A3V2	AD Converter Reference Voltage
	AB0-4	Address Bus
	AB0-4, AB12-15	Address Bus Line 0-4, 12-15
	ABSF	Focus Encoder Input
	ACI	Analogue Channel Cording IC
	AD	AD Converter
	AD	Auto Date, Analogue Digital Converter
	AD CLK	AD Clock
	AD REC	Audio Delayed REC
	AD0-6	Address
	AD0-6, ADR0-6	Address Data Line
	ADCLK	Analogue Digital Converter Clock
	ADCNT	Analogue Digital Control
	ADCS	Analogue Digital Chip Select
	A-DET	Audio Detect
	ADREC	Audio Delaied Rec
	ADUB	Audio Dubbing
	AE	Auto Expose
	AECNT	Auto Expose Control
	AEE(H)	Audio E-E (H)
	AEH	Audio Erase Head
	AEIRQ	Auto Expose Interrupt Request
	AF/MF	Auto Focus/Manual Focus
	AF DIS CS	AF DIS Chip Select
	A-FADE(L)	Audio Fade (L)
	AF-AMP	AF HALL Bias
	AFCS	Auto Focus Chip Select
	AFRP	Audio PLL Voltage Control
	AF-VN	Zoom Encoder V-Ref (–)
	AF-VP	Zoom Encoder VREF (+)
	AGC	Automatic Gain Control
	AGCCNT	Automatic Gain Control Control
	AGND	Analogue Ground/Audio Ground
	AGS	Anti Ground Shooting
	AH(P) / (R)	Audio Head (Play) / (Record)
	AHASW	Audio Head Amp Switch Pulse
	AHSW	Audio Head Switch Pulse
	AI, AO	Buffer Input, Output
	AIBCK	Bit Clock (to A/D Converter)
	AIDAT	Serial Data (to A/D Converter)
	AILRCK	L/R Clock (to A/D Converter)
	AIMCK	Master Clock (to A/D Converter)
	ALC CNT	Auto Level Control Control
	ALC MAIN	Auto Level Control Drive
	ALE	Address Latch Enable
	A-LOCK	Full Auto Switch
	A-MUT(H)	Audio Mute (H)
	ANLPTH	Analogue Loop Through High
	AORP	Audio Overlap Pulse
	APCNT	Aperture Control
	APS	Auto Power Save
	ART VH	Artifical Vertical Sync
	AT CNT	Automatic Tracking Gain Adjust
	ATF	Automatic Track Finding
	ATFCLK	41.85MHz Clock
	ATFG	Auto Track Gain
	ATL	Auto Lock Select
	ATN	Absolute Track Number
	ATR OFF(H)	Auto Tracking Off (H)
	ATV	Advanced TV
	AUDIO(N)	Audio (Normal)
	AUX	Auxiliary
	AVDD	Analogue VDD
	AVSS	Analogue Ground
	AWTB	Auto White Balance B-Y
	AWTR	Auto White Balance R-Y
B	BACK	Back-up
	BACK UP	Microcomputer Back-up
	BACK VDD	Back-up Power
	BATT	Battery
	BATT ALARM	Battery Alarm
	BATT REF	Reference Voltage for Battery
	BCB	B Carrier Balance
	BCBM(B-Y)	B-Y Carrier Balance
	BCBM(R-Y)	R-Y Carrier Balance
	BD0-7	REC/Play In/Out Buss
	BDCK	Standard Bus Data Clock (9MHz)
	BDEN	Standard Bus Data Enable
	BEND	Data Block End Request
	BF	Burst Flag Pulse
	BFA	Burst Flag Pulse for Encorder
	BFO/BFI	Burst Flug Input/Output
	BI, BO	Buffer Input, Output
	BL	Back Light
	BL ON	Back Light ON (L)
	BL4V	Back Light 4V
	BLC 0, 1	Back Light Y Control Out, In
	BLDI/O	Back Light Drive Input/Output
	BLK	Blanking Pulse
	BLKA	Blanking for Encorder
	BLKA	Blanking Pulse for Encorder
	BLKI/O	Blanking Pulse In/Out


C
B
A
1
2
3
4
AUTO/ MANUAL/ MODE
CAMERA ADJ/ VOL/JOG
ENC(+)
ENC SW
ENC(-)
MENU
AF/MF
REW
FF
STOP
PAUSE
PLAY
LCD OPEN
TO MAIN CONNECTION
TO FP6302
D GND 1
AF/MF 2
SCAN4 3
REW/SER(-) 4
FF/SER(+) 5
STOP/FADE 6
PAUSE/STILL 7
PLAY/BLC 8
SCAN3 9
MENU 10
LCD OPEN 11
D GND 12
ENC(-) 13
ENC(+) 14
D GND 15
ENC SW 16
CAM MOD 17
CAM MNL 18

NV-DS27,NV-DS28,NV-DS37,NV-DS38
SIDE CASE R UNIT(CAM/VTR OPERATION FLEX.)SCHEMATIC DIAGRAM

ORDER NO. VMD0105012C8

Service Manual

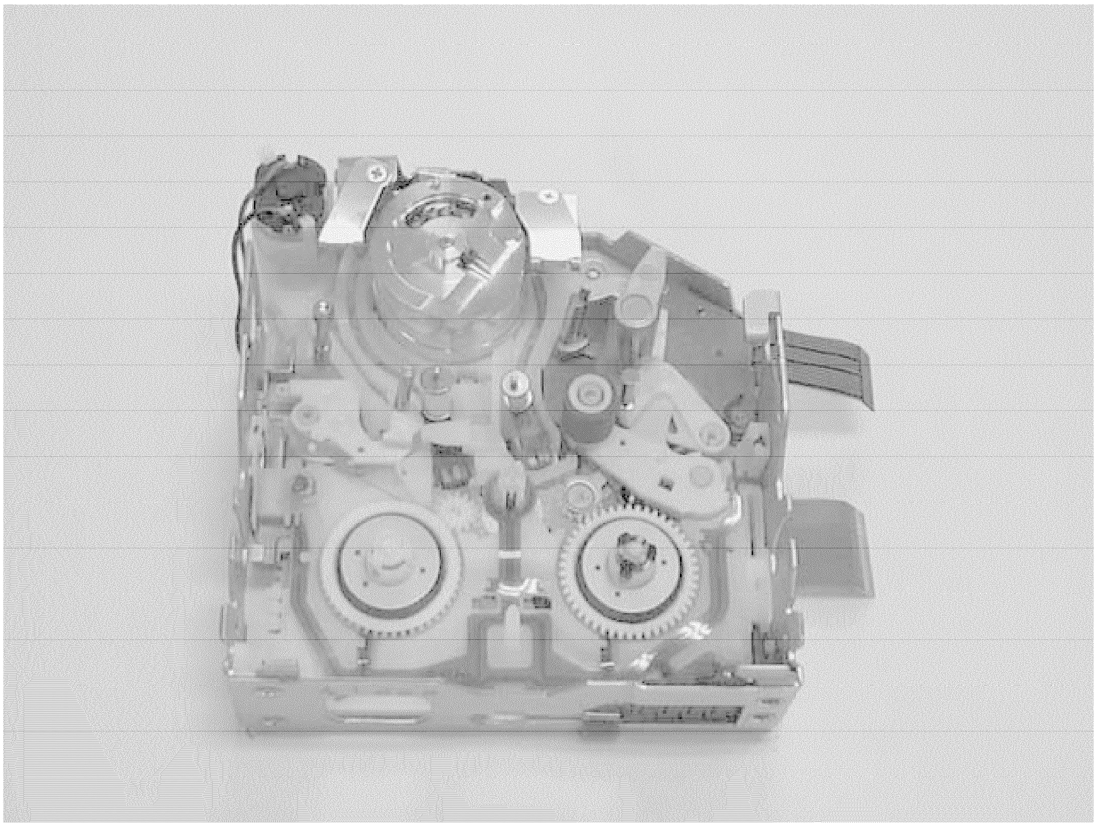
Digital Video Camera/Recorder

Panasonic Mini DV

N-MECHANISM

Disassembly/Assembly Procedures
Adjustment Procedures

SPECIFICATIONS



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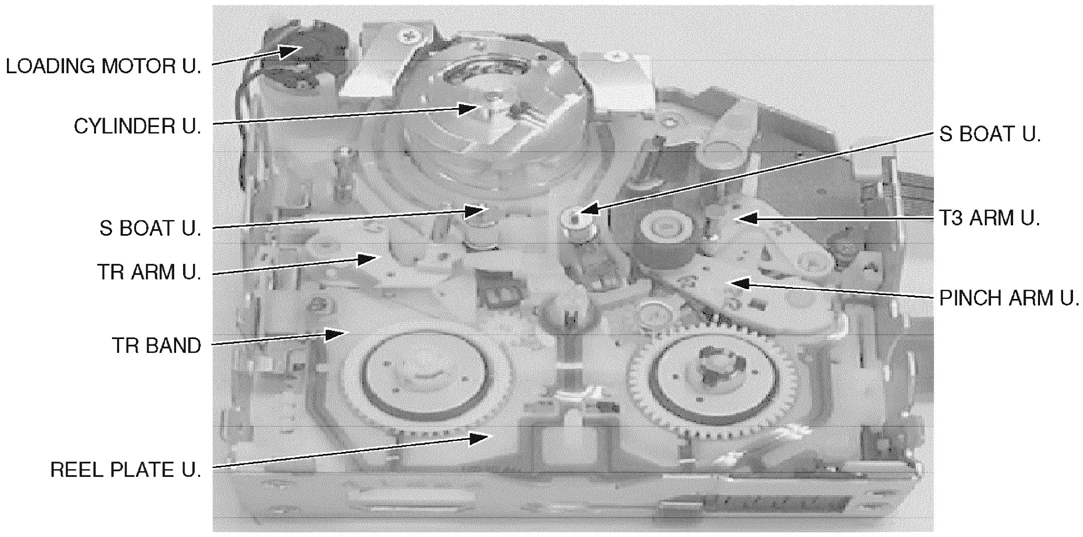
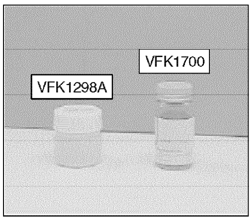
Panasonic

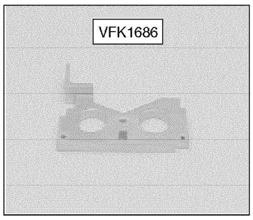
1. MECHANICAL PARTS LOCATION

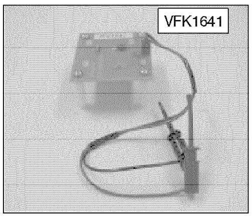

LOADING MOTOR U.
CYLINDER U.
S BOAT U.
TR ARM U.
TR BAND
REEL PLATE U.
S BOAT U.
T3 ARM U.
PINCH ARM U.

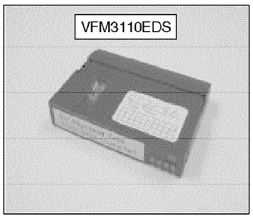
2. SERVICING FIXTURES& TOOLS

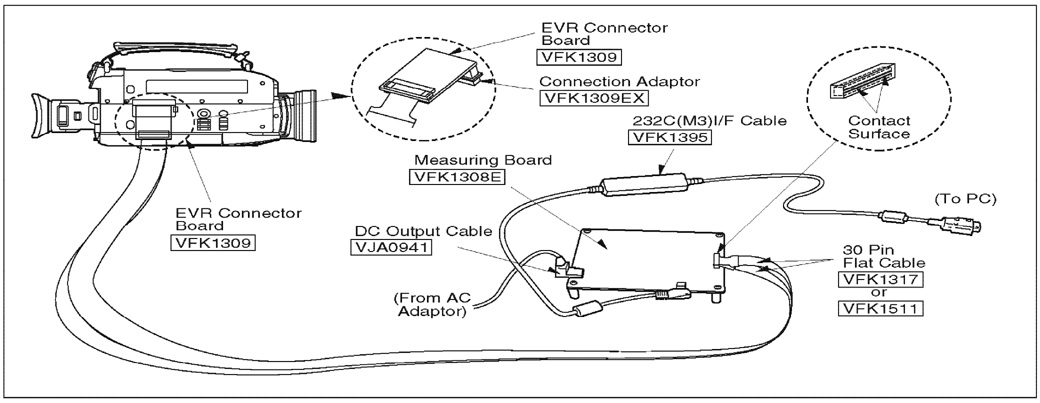
Parts Name	Pcs	Parts No.	New	Remarks
Mechanism Oil	**1**	**VFK1700**	**O**	**Pink**
Grease	**1**	**VFK1298A**	**O**	**White**
Tension Adjustment Plate	**1**	**VFK1686**	**O**	
ENV Detector Board	**1**	**VFK1641**	**O**	
DV Alignment Tape	**1**	**VFM3110EDS**	**-**	**PAL**
232C(M3) I/F Cable	**1**	**VFK1395**	**-**	
Mesuring Board	**1**	**VFK1308E**	**-**	
EVR Connector Board	**1**	**VFK1309**	**-**	
Connection Adaptor	**1**	**VFK1309EX**	**-**	
30 pin Flat Cable	**2**	**VFK1317**	**-**	**200mm type**
		VFK1511	**O**	**300mm type**
DC Output Cable	**1**	**VJA0941**	**-**	


VFK1700
VFK1298A






VFM3110EDS


EVR Connector Board
VFK1309
Connection Adaptor
VFK1309EX
232C(M3)I/F Cable
VFK1395
Contact Surface
Measuring Board
VFK1308E
(To PC)
EVR Connector Board
VFK1309
DC Output Cable
VJA0941
30 Pin Flat Cable
VFK1317
or
VFK1511
(From AC Adaptor)

3. DISASSEMBLY PROCEDURE

No.	Item	Fig.	Procedure
1	Dumper	Fig. 1	Release Eject Lever
		Fig. 2	Release Lock(A)
2	Garage U.	Fig. 3-1	Disengage Joints(B) at S and T sides
		Fig. 3-2	Disengage Joints(C) at S and T sides (*S side first)
3	Mechanism Flexible Cable	Fig. 4	1) Desolder each terminal / 2) Release 6 Hooks(D)
4	Cylinder U.	Fig. 5-1	1)Remove 4 Screws(E) / 2)Remove Cylinder Spring
		Fig. 5-2	Remove 1 Screw(F)
5	TR Band & TR Arm U.	Fig. 6	1)Release Hook(G) / 2)Remove Tension Adj. Screw / 3)Release Lock(H)
6	Reel Plate U.	Fig. 7-1	Make full loading condition with 3V battery.
		Fig. 7-2	Release Lock(I), (J), (K), (L).
		Fig. 7-3	Release Lock(M), (N), (O), (P) (*Lock(M) first)
		Fig. 7-4	Release Lock(Q)
		Fig. 7-5	Release Lock(R), (S)
		Fig. 7-6	Take Reel Plate U. out
7	Pinch Arm U.	Fig. 8	1)Make slightly unloading with 3V battery until Pinch Arm comes off the Capstan / Shaft. / 2)Release Lock(T)
8	T3 Arm U.	Fig. 9	Release Lock(U)
9	Loading Motor U.	Fig. 10	Release Locks(V)
10	TR Rod	Fig. 11	Take TR Rod out
11	Brake Gear	Fig. 12	Take Brake Gear out
12	S-Boat U. & S-Post Loading Band	Fig. 13	Pull out S-Loading Band, S-Boat U., T-Loading Band and Boat U.
13	T-Boat U. & T-Post Loading Band		
14	Rail	Fig. 14	Release Locks(W), (X), (Y), (Z), (a)

No.	Item	Fig.	Procedure
15	Connection Worm	Fig. 15	Take Connection Worm Gear out
16	Mode SW Gear	Fig. 16	Take Mode SW, T Load and Center Gears out
17	T Load Gear		
18	Center Gear		

Fig. 1

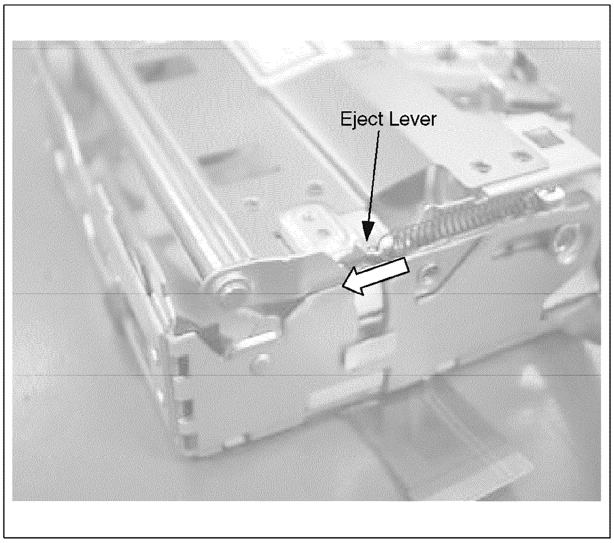


Fig. 2

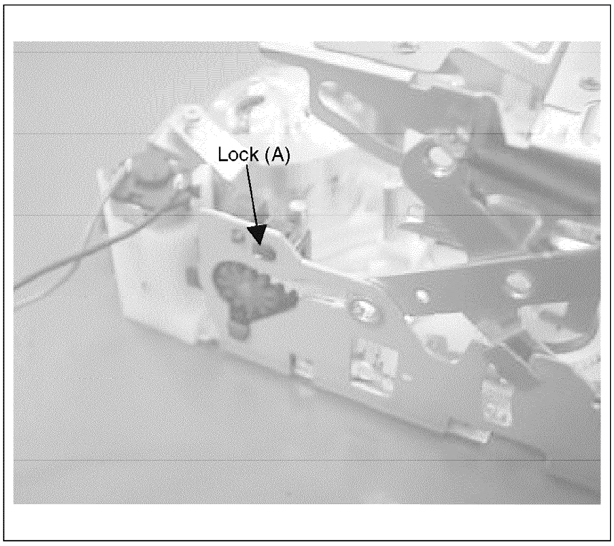


Fig. 3-1

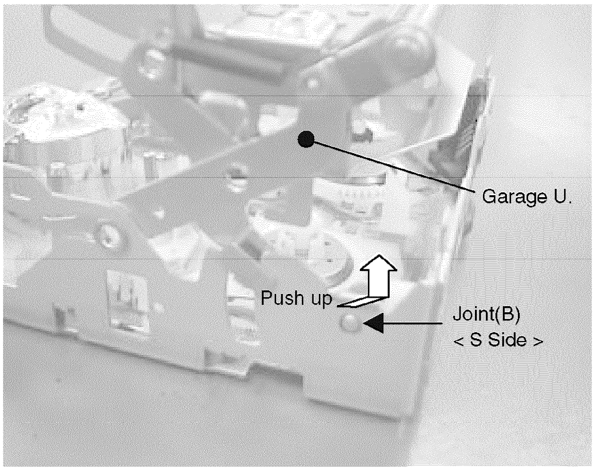

Garage U.
Push up
Joint(B)
< S Side >

Fig. 3-2

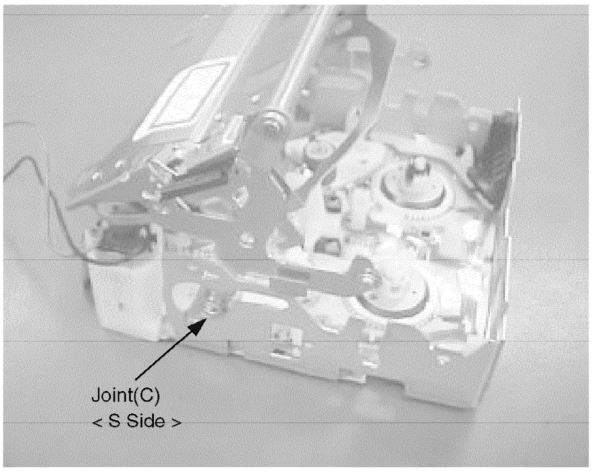

Joint(C)
< S Side >

Fig. 4

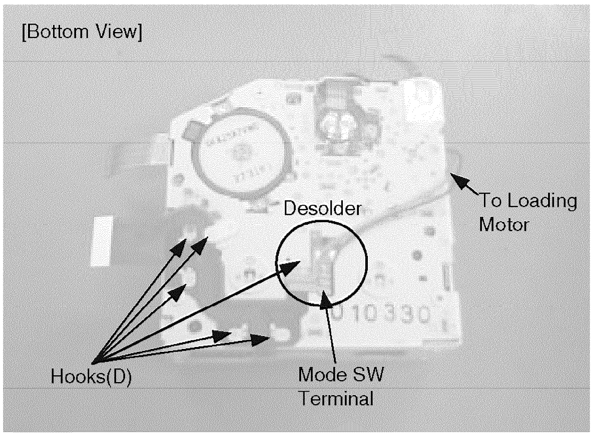

[Bottom View]
Desolder
To Loading
Motor
Hooks(D)
Mode SW
Terminal

Fig. 5-1

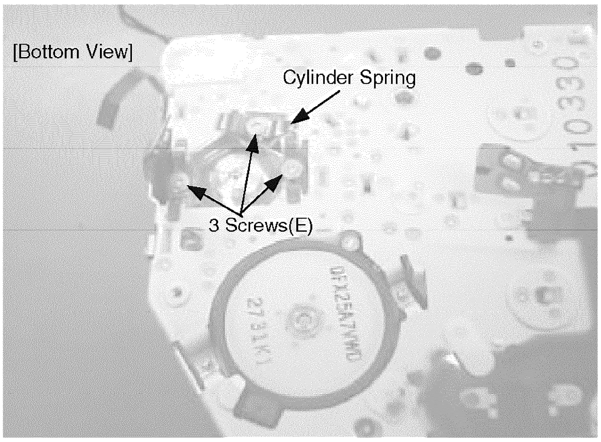

[Bottom View]
Cylinder Spring
3 Screws(E)

Fig. 5-2

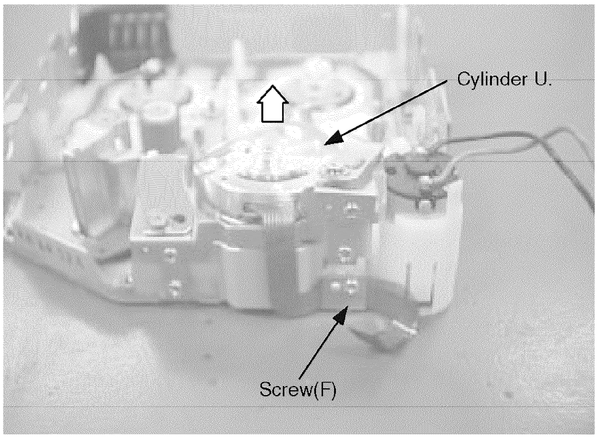

Cylinder U.
Screw(F)

Fig. 6

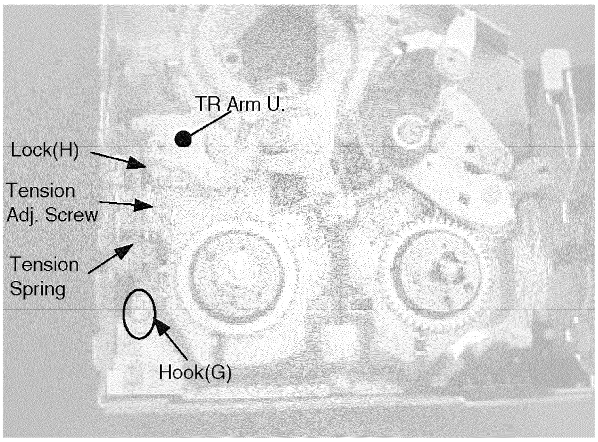

TR Arm U.
Lock(H)
Tension
Adj. Screw
Tension
Spring
Hook(G)

Fig. 7-1

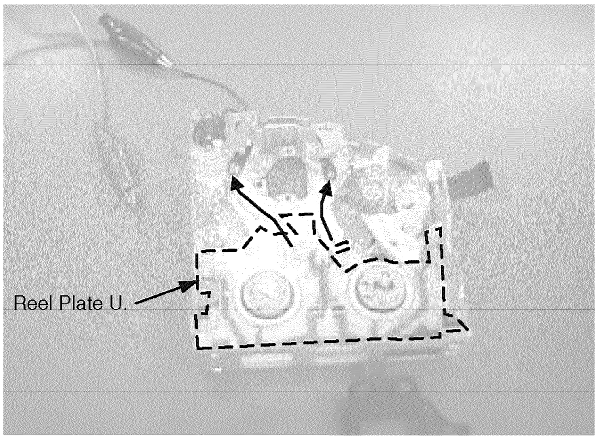

Reel Plate U.

Fig. 7-2

1) Insert screw driver under Reel Plate for upward pressure.
2) Release Lock(I),(J),(K),(L).

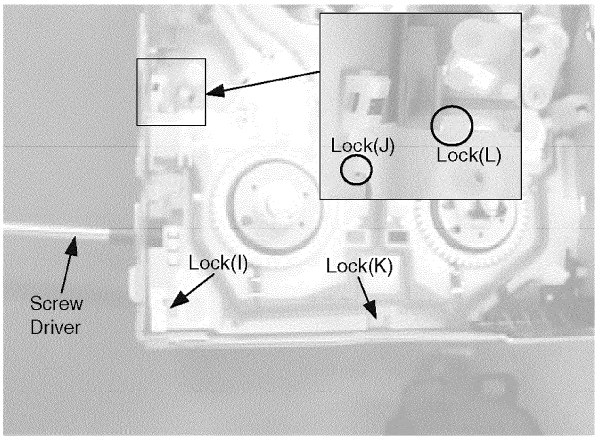

Lock(J)
Lock(L)
Lock(I)
Lock(K)
Screw Driver

Fig. 7-3

1) Keep releasing Lock(L), then turn the Mechanism U. upside down with screw driver inserted (to apply downward pressure to Reel Plate in this condition).
2) Release Lock(M), (N), (O), (P) (*Lock(M) first)

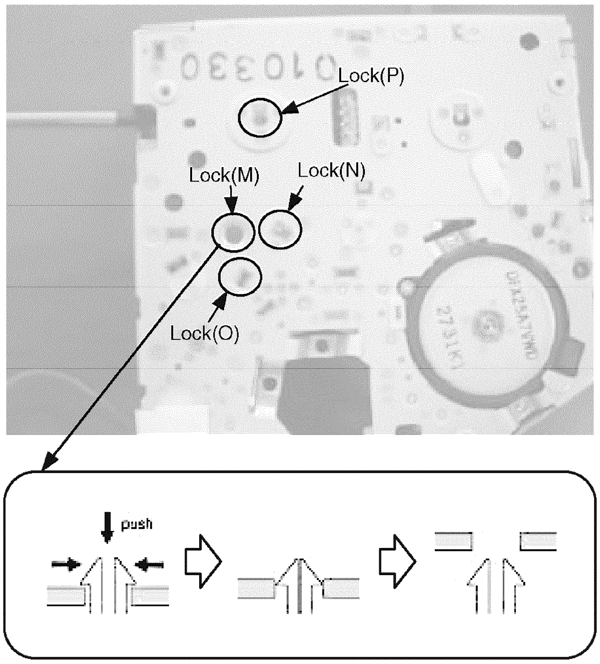

Lock(P)
Lock(M)
Lock(N)
Lock(O)
push

Fig. 7-4

1) Turn the mechanism U.
2) Release Lock(Q).

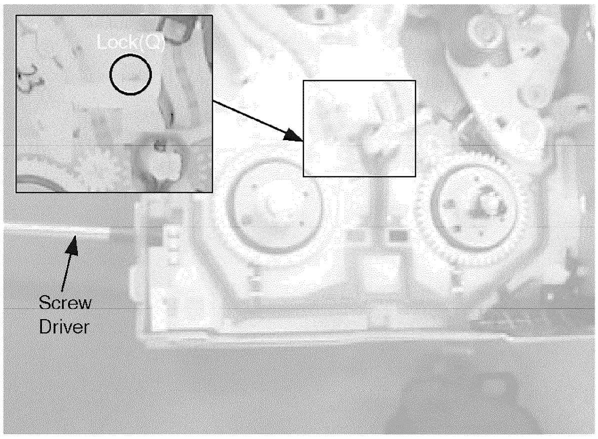

Lock(Q)
Screw
Driver

Fig. 7-5

1) Turn the mechanism U. again.
2) Release Lock(R), (S).

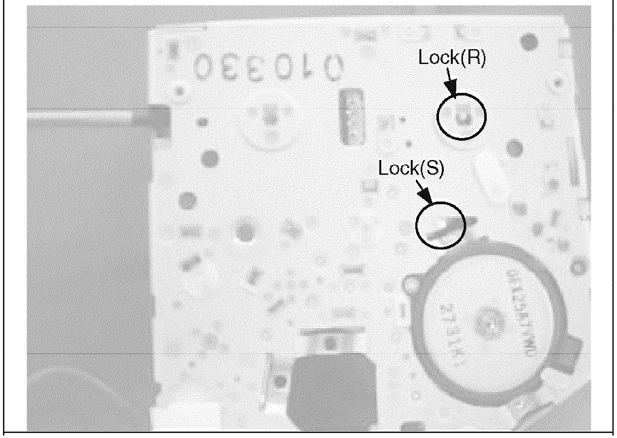

Lock(R)
Lock(S)

Fig. 7-6

1) Turn the mechanism U. again.
2) Take Reel Plate U. (slide and lift up).
(*Be careful for handling flat cable.)

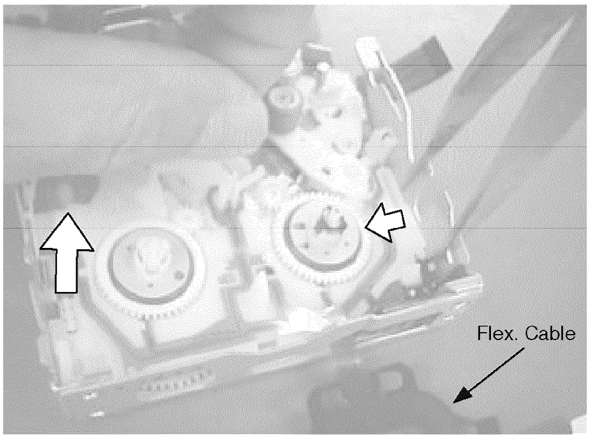


Fig. 8

1) Make slightly unloading with 3V battery until
Pinch Arm comes off the Capstan Shaft.
2) Release Lock(T).

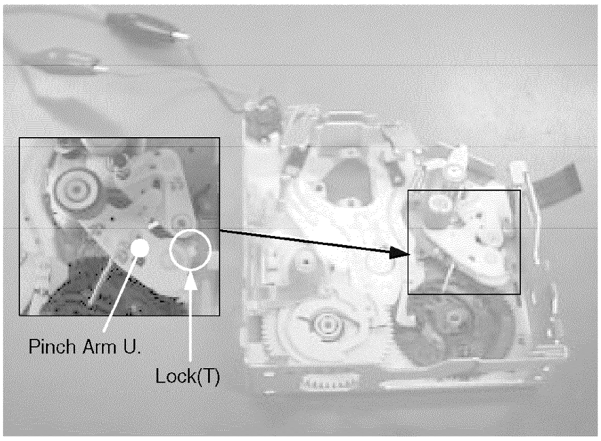

Pinch Arm U.
Lock(T)

Fig. 9

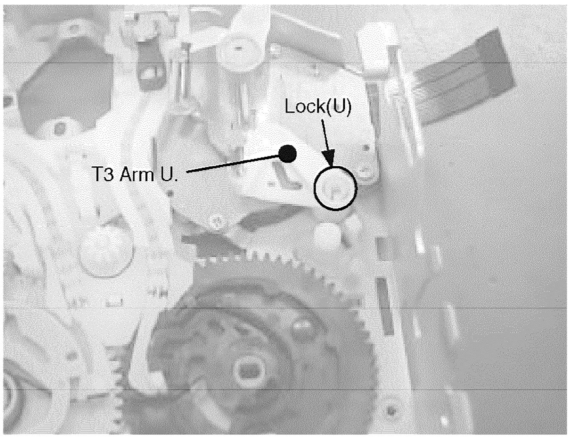

Lock(U)
T3 Arm U.

Fig. 10

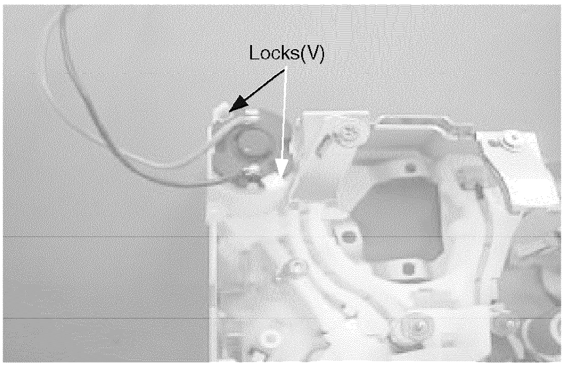


Fig. 11

```
NOTATION PUBLIC "-//ALDUS//NOTATION TAGGED IMAGE FILE FORMAT//EN"
ENTITY SYSTEM "d_11.tif"
```

Fig. 12

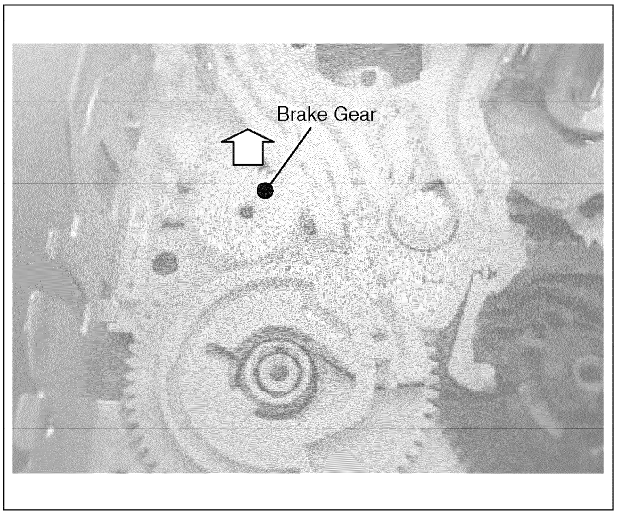


Fig. 13

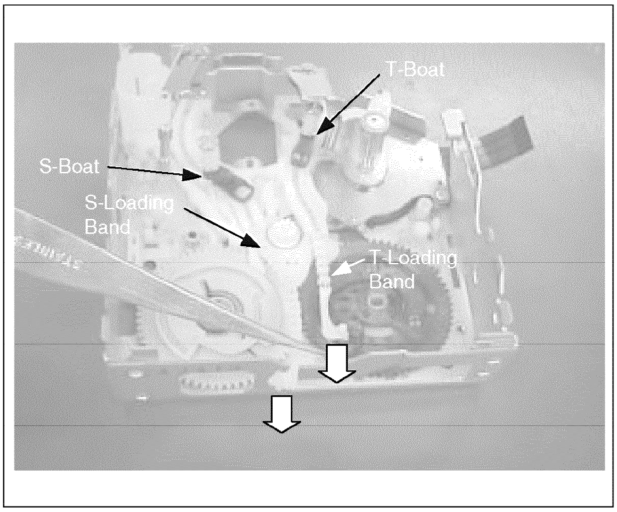

T-Boat
S-Boat
S-Loading Band
T-Loading Band

Fig. 14

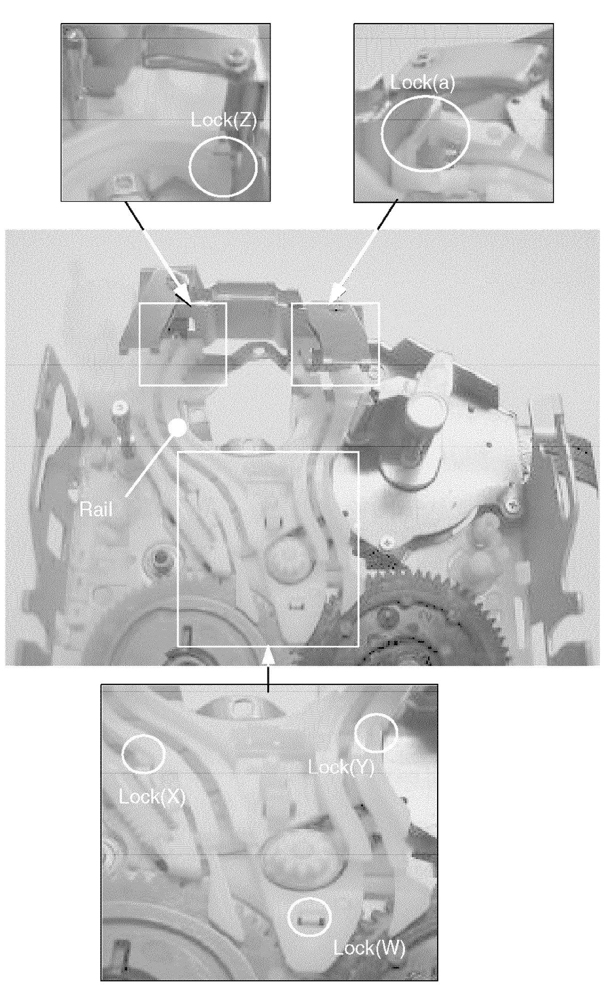

Lock(Z)
Lock(a)
Rail
Lock(X)
Lock(Y)
Lock(W)

Fig. 15

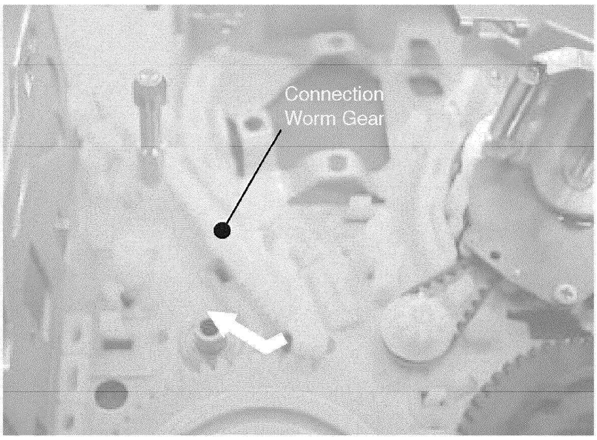
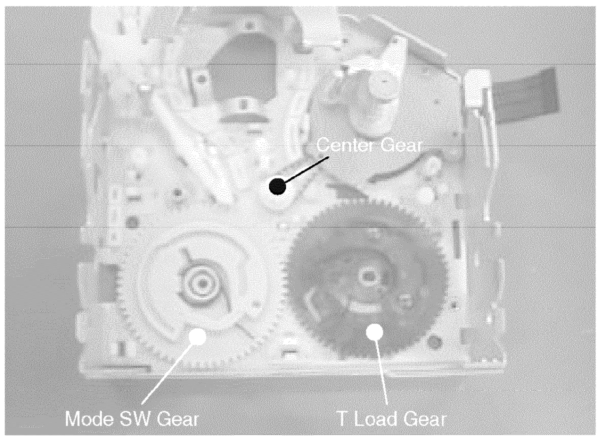

Connection
Worm Gear

Fig. 16



4. ASSEMBLY PROCEDURE

No.	Item	Fig.	Oil & Grease	Procedure
1	Center Gear	Fig. 1	-	Install Center Gear
2	Mode SW Gear		Grease	Install Mode SW Gear
3	T Load Gear	Fig. 2	Grease	Install T-Load Gear so that triangle phase marks on Mode SW and T Load Gears meet each other.
4	Rail	Fig. 3	-	Install Rail and fix it with 5 Locks(W), (X), (Y (Z) and (a)
5	Connection Worm		Grease	Install Connection Worm
6	S-Boat U. & S-Post Loading Band	Fig. 4	Oil / Grease	1) Install S and T-Boats together with Loadi Band / 2) Connect S-Loading Band to Mode and T-Loading Band to / T-Load Gear
7	T-Boat U. & T-Post Loading Band			
8	Brake Gear	Fig. 5	-	Install Brake Gear
9	TR Rod	Fig. 6	-	Install TR Rod
10	Loading Motor U.	Fig. 7	Grease	Install Loading Motor
11	T3 Arm U.	Fig. 8	-	Install T3 Arm U.
12	Pinch Arm U.	Fig. 9	-	Install Pinch Arm U.
13	Reel Plate U.	Fig. 10-1	-	Confirm Idler position and set it into Reel Pl U.
		Fig. 10-2	Grease	Install Reel Plate U.
		Fig. 10-3	-	Fix Reel Plate U. with 11 Locks(I), (J), (K), (L (M), (N), (O), (P), (Q), (R) and (S)
		Fig. 10-4	-	Fix Flex. Cable with 6 Hooks(D)

No.	Item	Fig.	Oil & Grease	Procedure
14	TR Band & TR Arm U.	Fig. 11-1	-	Connect TR Arm and TR Band
		Fig. 11-2	-	1) Make full unloading condition with 3V bat / 2) Install TR Arm U.
		Fig. 11-3	-	Adjust Tension
		Fig. 11-4	-	
		Fig. 11-5	-	
15	Cylinder U.	Fig. 12-1	-	1) Make full unloading condition with 3V bat / 2) Install Cylinder U.
		Fig. 12-2	-	Turn the mechanism and install Cylinder Spring, then tighten 3 screws(E)
		Fig. 12-3	-	Tighten 1 screw(F) for Cylinder Flex. Cable
16	Mechanism Flexible Cable	Fig. 13	-	Solder each terminal
17	Garage U.	Fig. 14-1	Oil	1) Engage joints(C) at S and T sides (*T side first).
		Fig. 14-2	-	2) Engage joints(B) at both S and T sides
18	Dumper	Fig. 15	-	Install Dumper

The following parts should be applied the Oil (VFK1700) or Grease (VFK1298A).

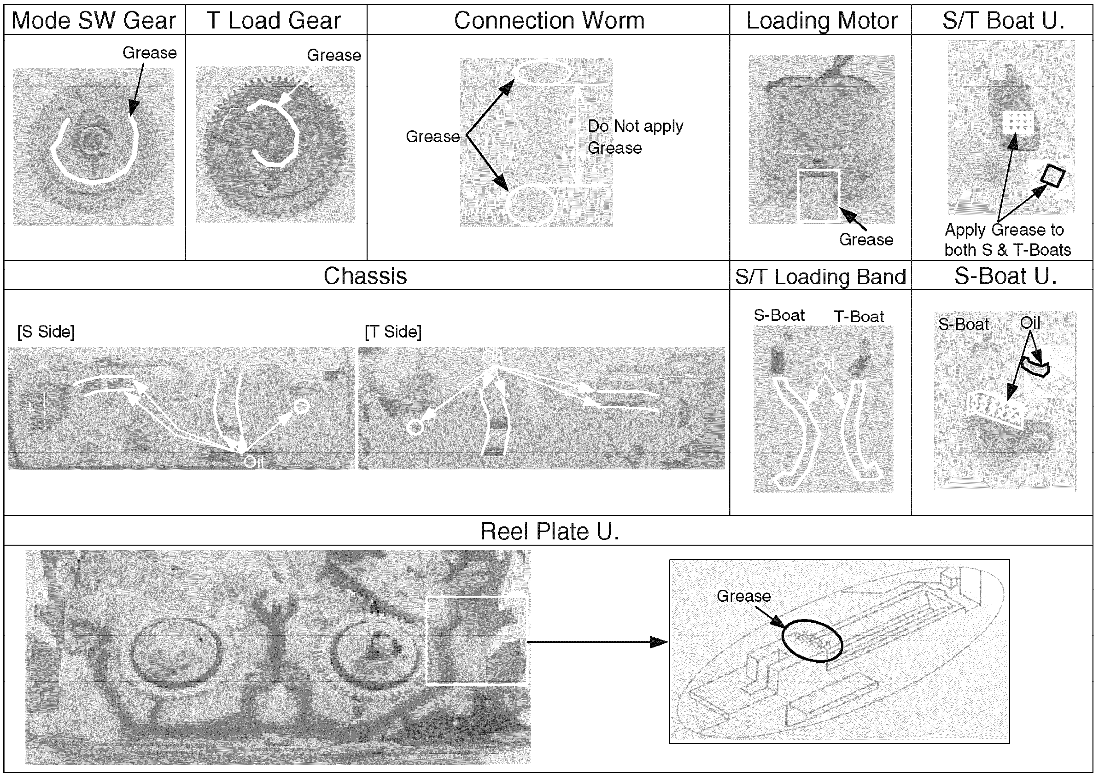

Mode SW Gear
Grease
T Load Gear
Grease
Connection Worm
Grease
Do Not apply Grease
Loading Motor
Grease
S/T Boat U.
Apply Grease to both S & T-Boats
Chassis
[S Side]
Oil
[T Side]
Oil
S/T Loading Band
S-Boat
T-Boat
Oil
S-Boat U.
S-Boat
Oil
Reel Plate U.
Grease

Fig. 1

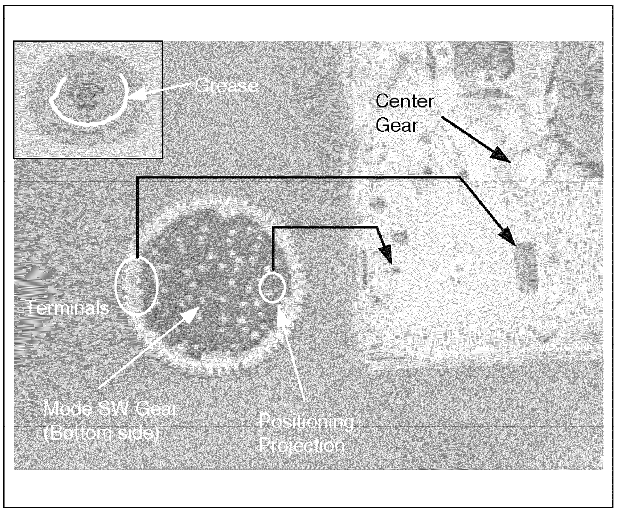

Grease
Center Gear
Terminals
Mode SW Gear (Bottom side)
Positioning Projection

Fig. 2

1) Install T-Load Gear so that triangle phase marks on Mode SW and T Load Gears meet to each other.

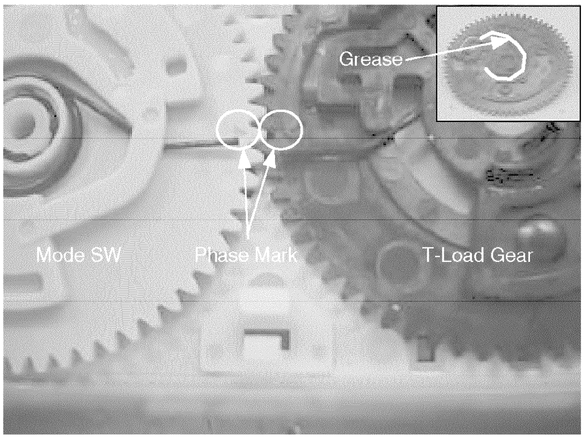

Grease
Mode SW
Phase Mark
T-Load Gear

Fig. 3

1) Install Rail and fix it with 5 Locks(W), (X), (Y), (Z) and (a).
2) Install Connection Worm.

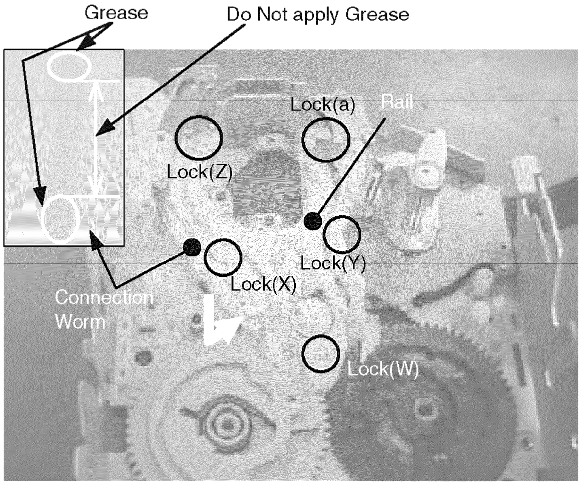
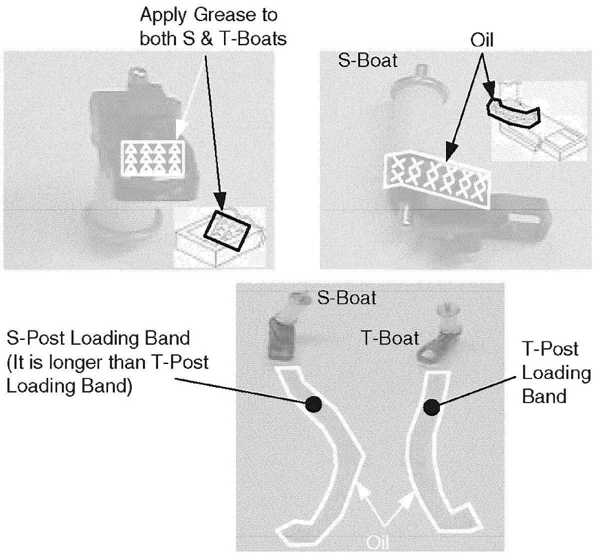
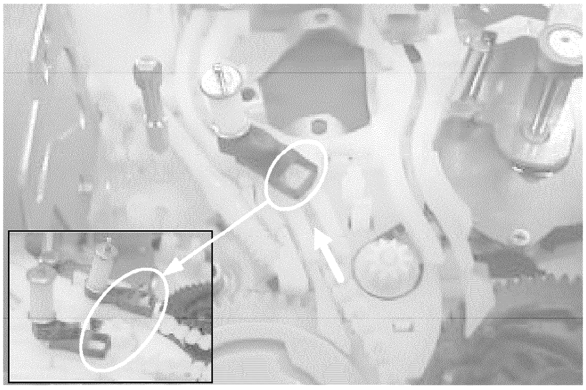

Grease
Do Not apply Grease
Lock(a)
Rail
Lock(Z)
Lock(Y)
Lock(X)
Connection Worm
Lock(W)

Fig. 4


Apply Grease to both S & T-Boats
S-Boat
Oil
S-Boat
T-Boat
S-Post Loading Band (It is longer than T-Post Loading Band)
T-Post Loading Band
Oil

1) Install S and T Boats together with Loading Band and set full loading condition.



2) Connect S-Loading Band to Mode SW and T-Loading Band to T-Load Gear.

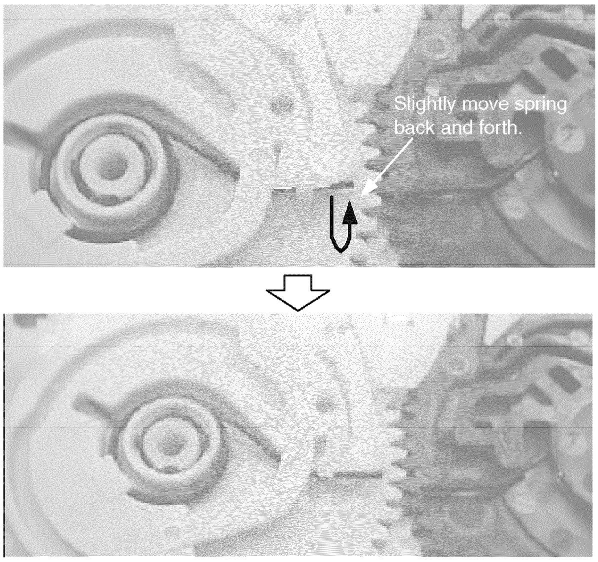

Slightly move spring back and forth.

Fig. 5

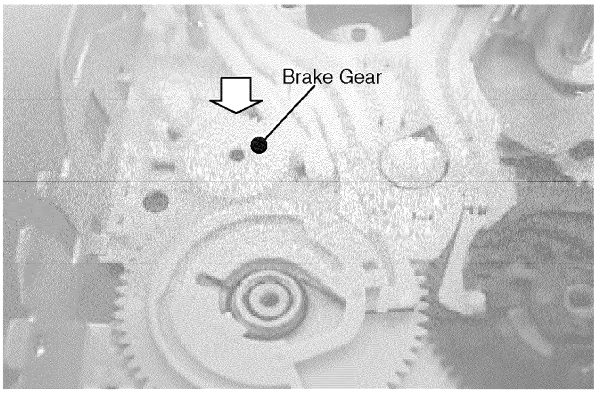


Fig. 6

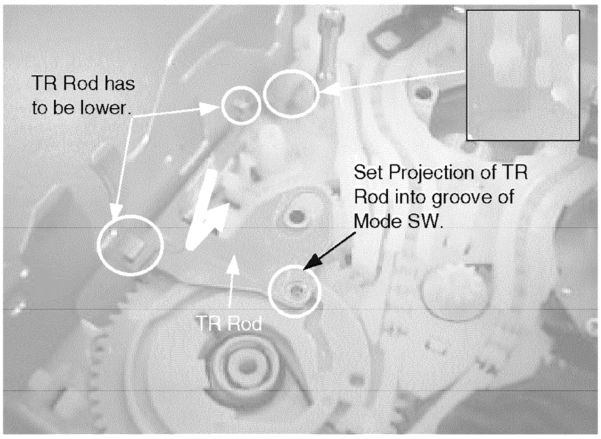

TR Rod has
to be lower.
Set Projection of TR
Rod into groove of
Mode SW.
TR Rod

Fig. 7

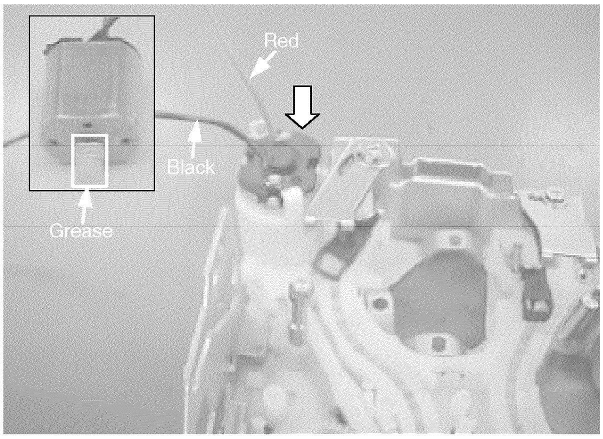

Red
Black
Grease

Fig. 8

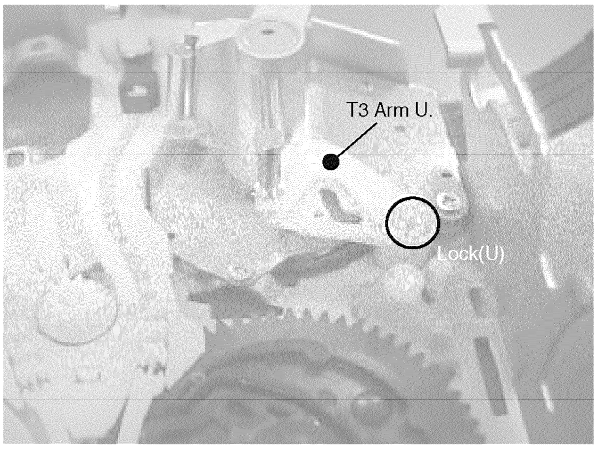
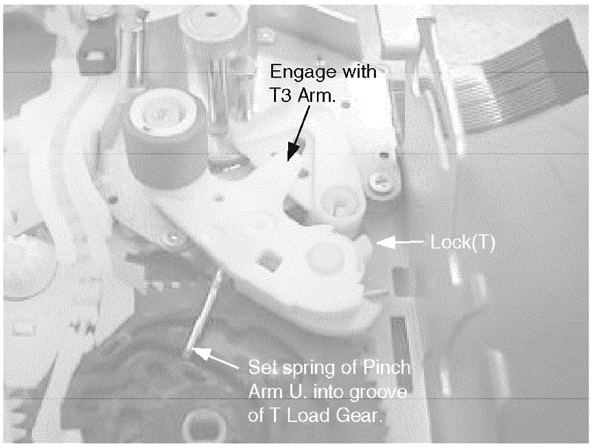

T3 Arm U.
Lock(U)

Fig. 9


Engage with T3 Arm.

Set spring of Pinch Arm U. into groove of T Load Gear.

Fig. 10-1

1) Confirm Idler position and set it into Reel Plate U. if necessary.

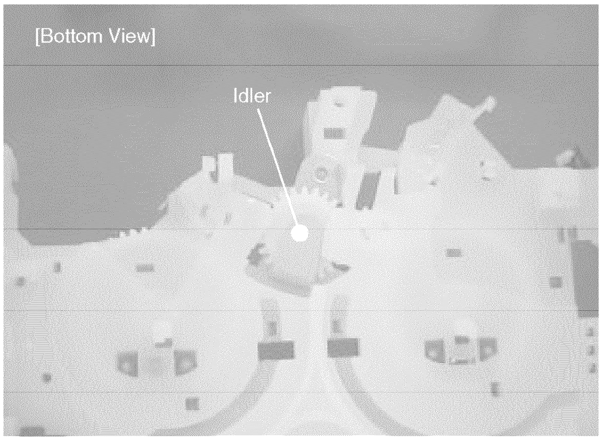
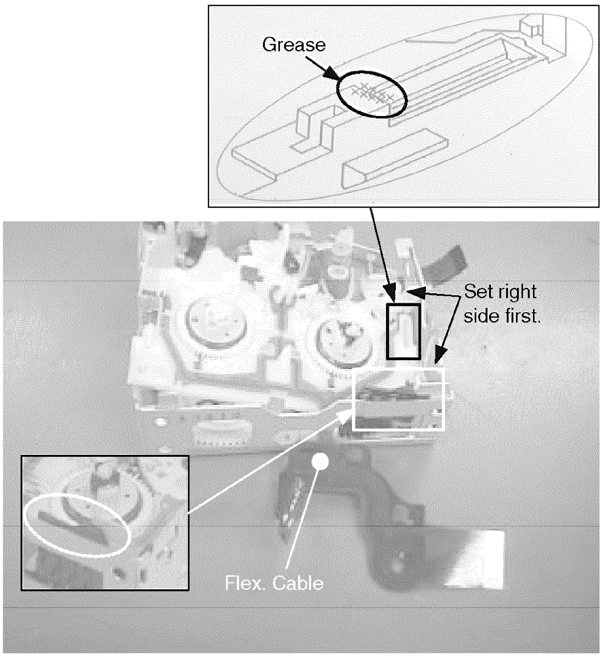

[Bottom View]
Idler

Fig. 10-2

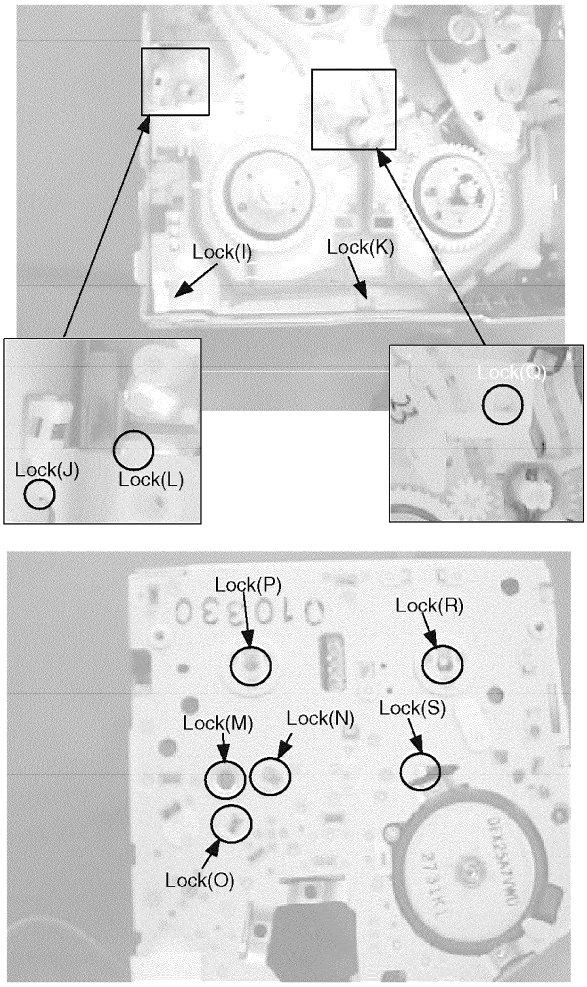
Note:
Before installing Reel Plate U., confirm that triangle phase marks on Mode SW and T-Load Gears are meeting to each other.
If not, align the phase marks again.



Set right side first.

Fig. 10-3

1) Fix Reel Plate U. with 11 Locks(I), (J), (K), (L), (M), (N), (O), (P), (Q), (R) and (S).


Lock(I)
Lock(K)
Lock(J)
Lock(L)
Lock(Q)
Lock(P)
Lock(R)
Lock(M)
Lock(N)
Lock(S)
Lock(O)

Confirm the smooth movement of Idler by rotating Capstan Rotor manually.

Fig. 10-4

1) Fix Flex. Cable with 6 Hooks(D).

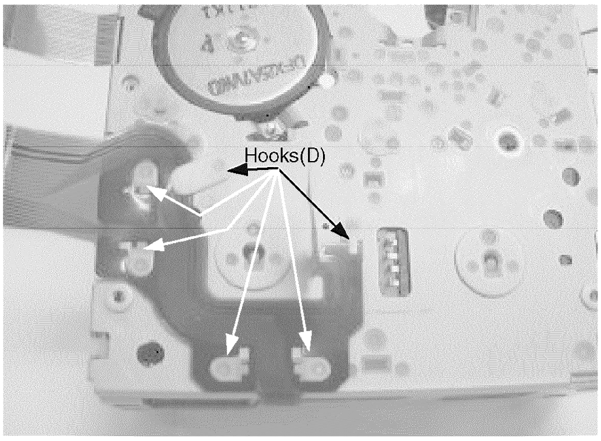


Fig. 11-1

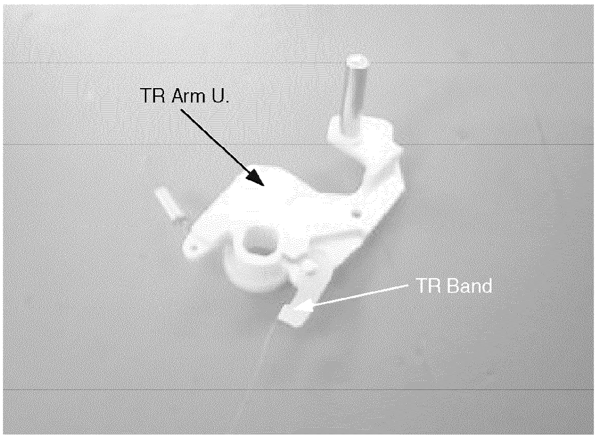

TR Arm U.
TR Band

Fig. 11-2

1) Make full unloading condition with 3V battery.
2) Install TR Arm U. and fix it with Lock(H).
   Note: Confirm the position of TR Arm U.
3) Slightly tighten Tension Adj. Screw.
   Note: Do not fully tighten Tension Adj. Screw.
4) Hook Tension Spring to the original position.

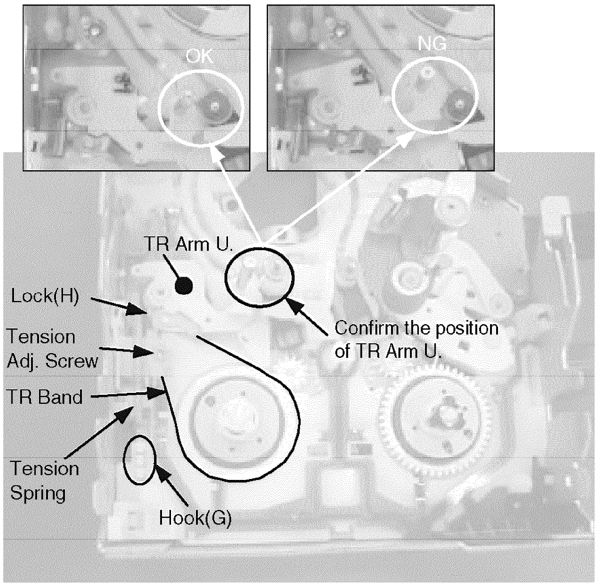

OK
NG
TR Arm U.
Lock(H)
Tension Adj. Screw
TR Band
Tension Spring
Hook(G)
Confirm the position of TR Arm U.

Fig. 11-3

[Tension Adjustment]

1) Move the mechanism position in the Play mode with 3V battery.(Play mode: Pinch Roller just touch to the capstan shaft.)

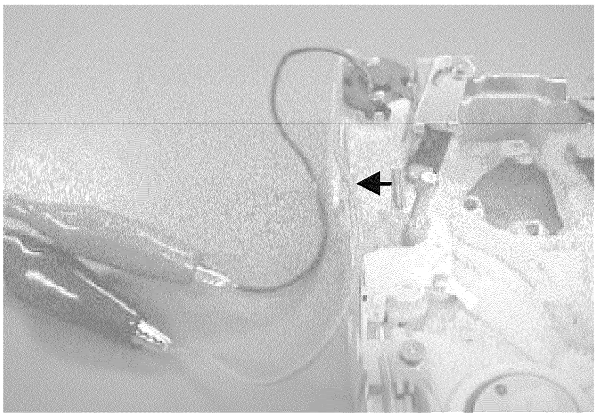


Fig. 11-4

2) Set the Tension Adj. Plate into the mechanism.

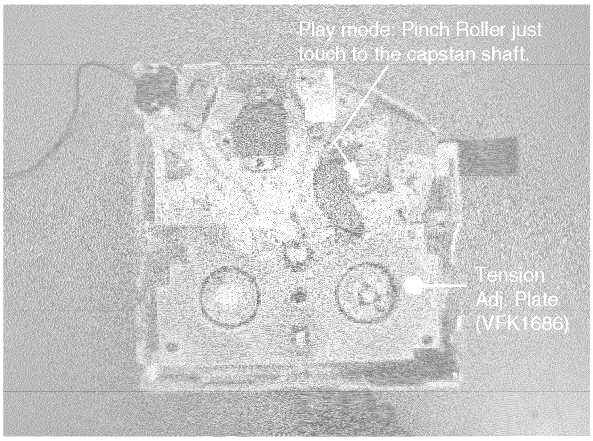

Play mode: Pinch Roller just touch to the capstan shaft.
Tension Adj. Plate (VFK1686)

Fig. 11-5

3) Slowly turn Tension Adj. Screw counterclockwise the left edge of TR Arm shaft comes within the specification.

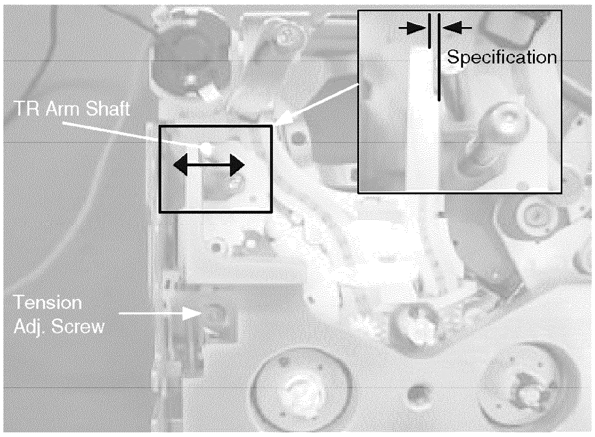

Specification
TR Arm Shaft
Tension
Adj. Screw

Fig. 12-1

1) Make full unloading condition with 3V battery.
2) Install Cylinder U.

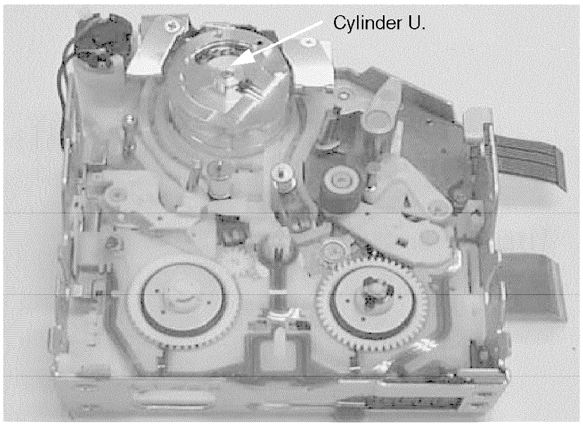


Fig. 12-2

3) Turn the mechanism and install Cylinder Spring, then tighten 3 screws(E).

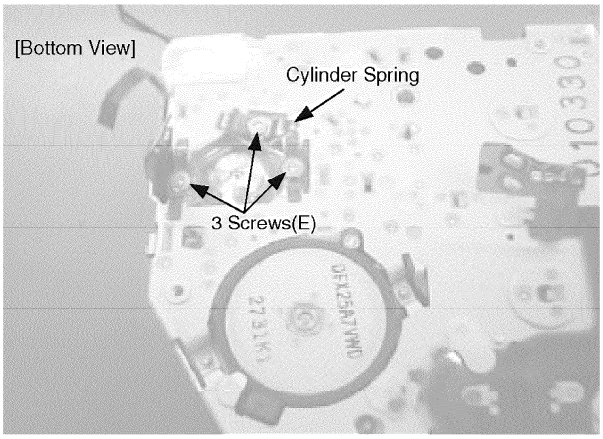

[Bottom View]
Cylinder Spring
3 Screws(E)

Fig. 12-3

4) Tighten 1 screw(F) for Cylinder Flex. Cable.

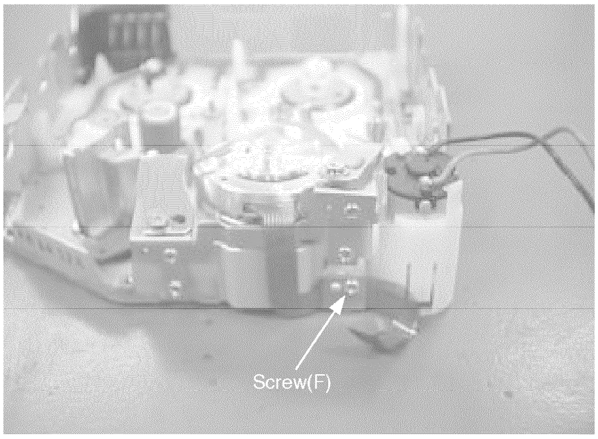


Fig. 13

1) Solder Mode SW terminal and Loading Motor Cable.

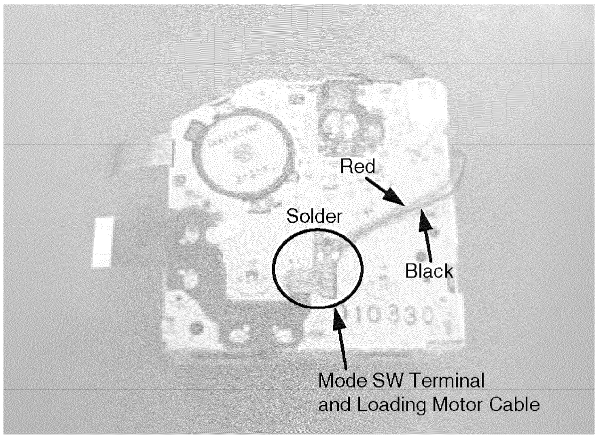

Red
Solder
Black
Mode SW Terminal
and Loading Motor Cable

Fig. 14-1

1) Apply Oil to chassis, then engage joints(C) at both S and T sides (*T side first).

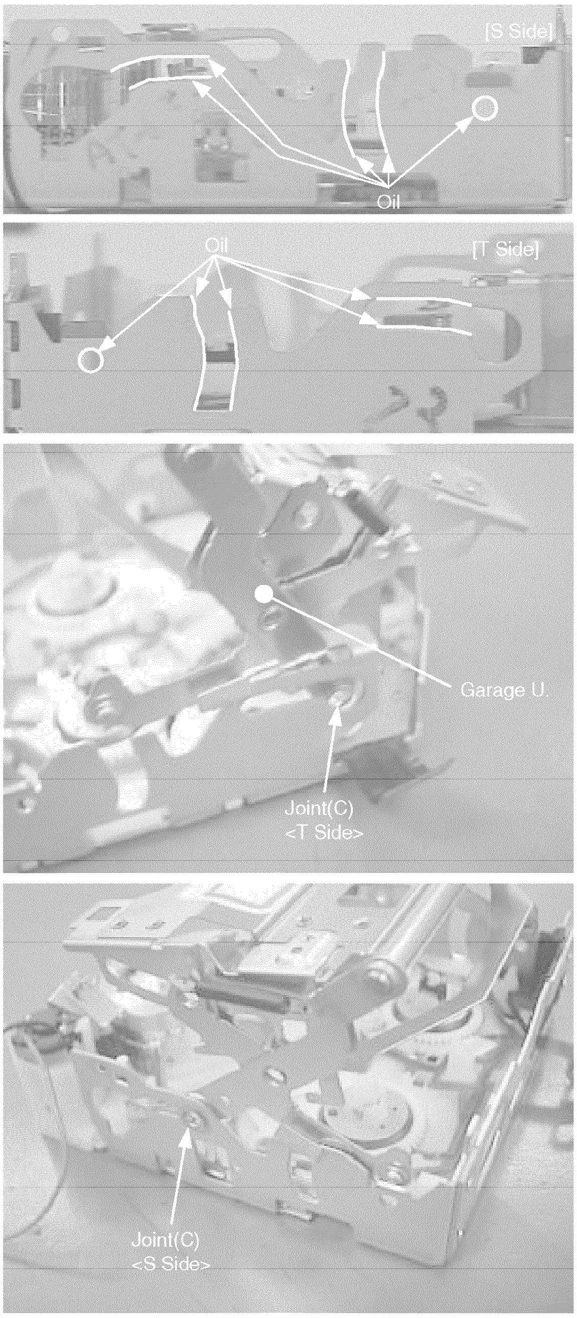

[S Side]
Oil
Oil
[T Side]
Garage U.
Joint(C)
<T Side>
Joint(C)
<S Side>

Fig. 14-2

2) Engage joints(B) at both S and T sides.

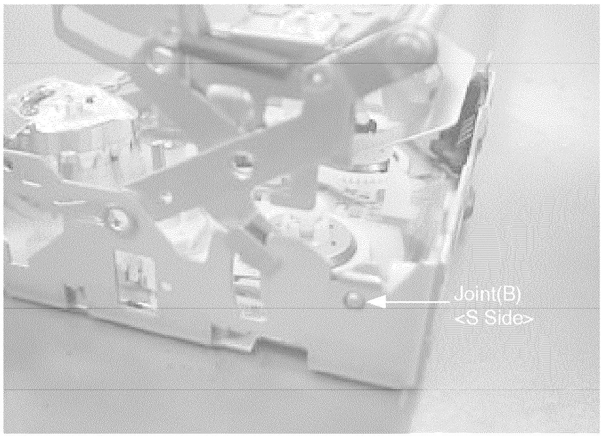
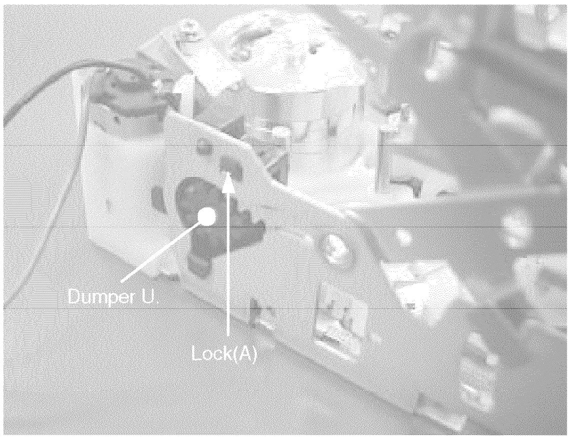
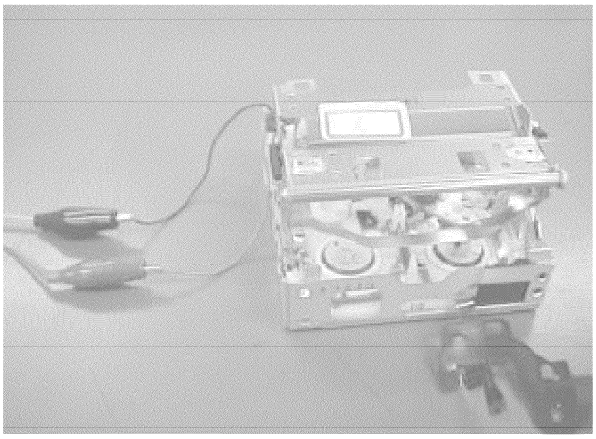


Fig. 15

1) Install Dumper U. and fix with Lock(A).



2) Make slightly loading with 3V battery to lower down the Garage U.



Note:
Finally, confirm the mechanical movement with 3V battery.

5. MECHANICAL ADJUSTMENT

5.1. ADJUSTMENT TABLE

When each mechanical part as below will be replaced, each adjustment must be done.
" O " mark in the foolowing table means that it is necessary to adjust.
" --- " mark in the following table means that it is unnecessary to adjust.

Part Name	Confirmation of Tape Running	Linearity Adjustment	Sensor Sensitivity Adjustment	Confirmation of B.E.R. Value	Tension Adjustment
MECHA. CHASSIS	---	---	---	O	---
MECHA. CHASSIS (1) U.	O	O	---	O	---
DUMPER U.	---	---	---	O	---
GARAGE U.	---	---	---	O	---
CYLINDER U.	---	O	---	O	---
CYLINDER SPRING	---	O	---	O	---
TR ARM	O	---	---	O	O
TR BAND	---	---	---	O	O
TENSION SPRING	---	---	---	O	O
REEL PLATE U.	---	---	O	O	O
IDLER U.	---	---	---	O	O
PINCH ARM U.	O	---	---	O	O
T3 ARM U.	O	---	---	O	O
LOADING MOTOR U.	---	---	---	O	---
TR ROD	---	---	---	O	O
BRAKE GEAR	---	---	---	O	O
S-BOAT U.	O	---	---	O	O
T-BOAT U.	O	---	---	O	O
S-POST LOADING BAND	O	---	---	O	O
T-POST LOADING BAND	O	---	---	O	O
RAIL	---	---	---	O	O
CONNECTION WORM	---	---	---	O	O
MODE SW U.	---	---	---	O	O
T LOAD GEAR U.	---	---	---	O	O
CENTER GEAR	---	---	---	O	O

5.2. ADJUSTMENT PROCEDURE

No.	Item	Procedure	
1	Confirmation of Tape Running	Equipment	1. Mini DV Cassette
		Specification	Refer to Fig. 1-1 and Fig. 1-2
		1) Confirm each post position in playback mode. (Fig. 1-1) 2) Confirm condition of tape regulation of each post in playba and review modes. / (Fig. 1-2)	
2	Linearity Adjustment	Equipment	1. DV Alignment Tape (VFM3110EDS) 2. ENV Detector Board (VFK1641) 3. Mesuring Board (VFK1308E) 4. 232C(M3) I/F Cable (VFK1395) 5. EVR Connector Board (VFK1309) 6. ConnectionAdaptor (VFK1309EX) 7. 30 pin Flat Cable(X2) (VFK1317 or VFK1511) 8. DC Output Cable (VJA0941) 9. Personal Computer
		Specification	Refer to Fig. 2-5
		1) Connect the cables and boards between camera unit and P (Fig. 2-1) 2) Connect the ENV Detector Board between Mesuring Board Oscilloscope. / (Fig. 2-2) 3) Remove the Adjustment Cover. (Fig. 2-3) 4) Playback the Alignment Tape. 5) Adjust S1 and/or T1 posts by screw driver until waveformis spec. (Fig. 2-4, Fig. 2-5) 6) After Linearity adjustment, B.E.R. value should be confirme by using Tatsujin / AdjustmentKit.	
3	Sensor Sensitivity Adjustment	Refer to Tatsujin Adjustment.	
4	Confirmation of B.E.R. Value	Refer to Tatsujin Adjustment.	
5	Tension Adjustment	Refer to TR Band & TR Arm U. assembly section of this manu	

Fig. 1-1

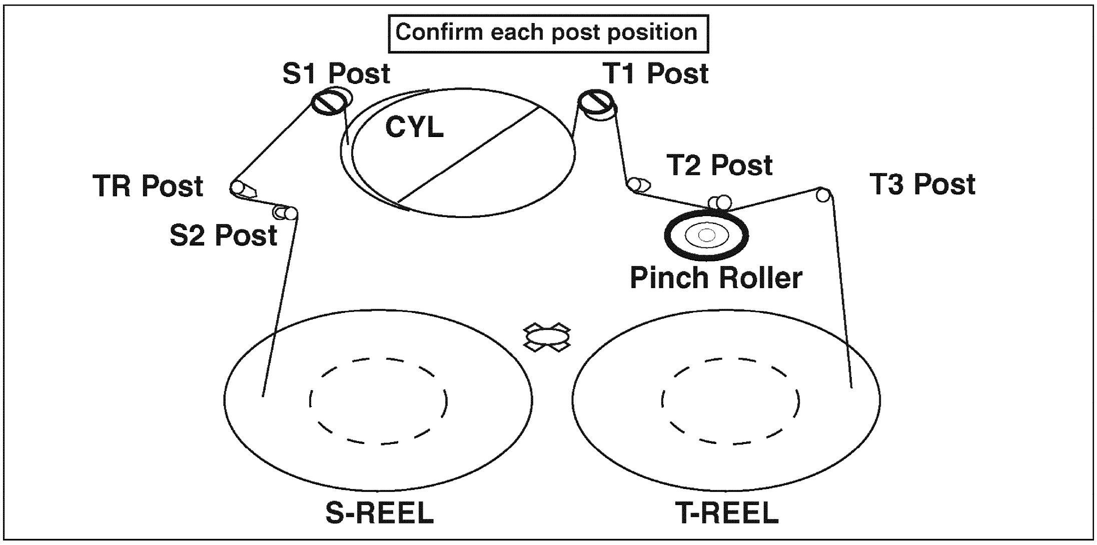
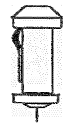
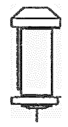
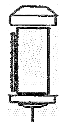
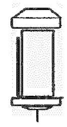
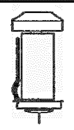
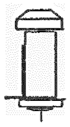
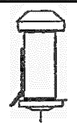


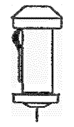
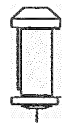
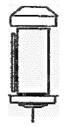
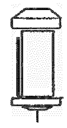
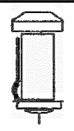
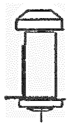
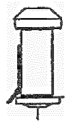
Fig. 1-2

PLAYBACK MODE

	Condition of Tape Regulation						
	A	B	C	D	E	F	G
	Upper Curl	Upper Regulation	Center Regulation	Lower Regulation	Lower Curl	Edge Bending	Edge Slacking
							
S2 POST	NG	NG	**OK**	**OK**	NG	NG	NG
S1 POST	NG	**OK**	NG	NG	NG	NG	NG
T1 POST	NG	**OK**	NG	NG	NG	NG	NG
T3 POST	NG	NG	**OK**	NG	NG	NG	NG

*S1 and T1 Posts can be adjusted. (Refer to Linearity Adjustment)

REVIEW MODE

	Condition of Tape Regulation						
	A	B	C	D	E	F	G
	Upper Curl	Upper Regulation	Center Regulation	Lower Regulation	Lower Curl	Edge Bending	Edge Slacking
							
S2 POST	NG	NG	**OK**	**OK**	NG	NG	NG
S1 POST	NG	**OK**	NG	NG	NG	NG	NG
T1 POST	NG	**OK**	**OK**	**OK**	NG	NG	NG
T3 POST	NG	**OK**	**OK**	**OK**	NG	NG	NG

*S1 and T1 Posts can be adjusted. (Refer to Linearity Adjustment)

Fig. 2-1

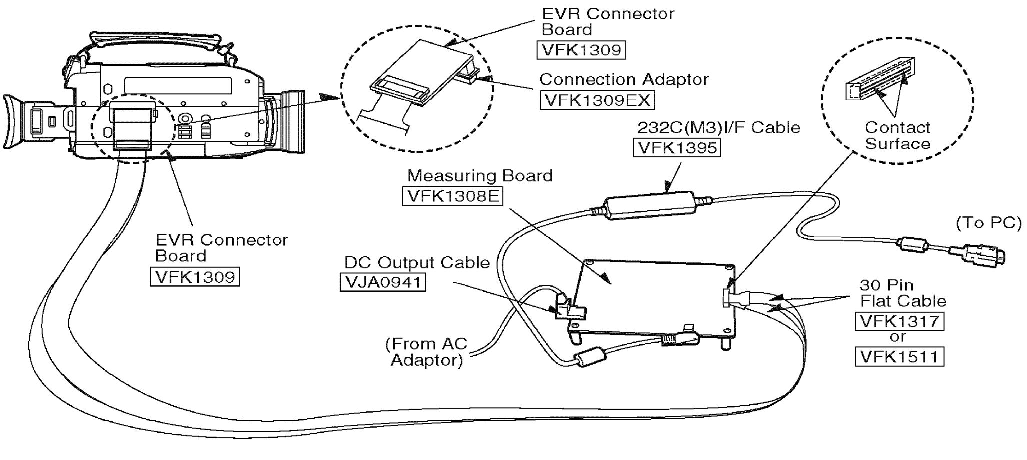

EVR Connector Board
VFK1309
Connection Adaptor
VFK1309EX
232C(M3)I/F Cable
VFK1395
Contact Surface
Measuring Board
VFK1308E
(To PC)
EVR Connector Board
VFK1309
DC Output Cable
VJA0941
30 Pin Flat Cable
VFK1317
or
VFK1511
(From AC Adaptor)

Fig. 2-2

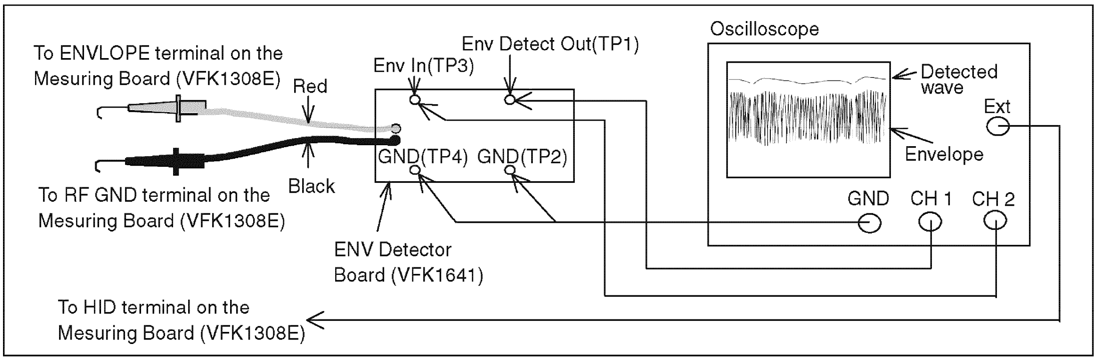

To ENVLOPE terminal on the
Mesuring Board (VFK1308E)
Red
Black
To RF GND terminal on the
Mesuring Board (VFK1308E)
Env In(TP3)
Env Detect Out(TP1)
GND(TP4)
GND(TP2)
ENV Detector
Board (VFK1641)
Oscilloscope
Detected
wave
Ext
Envelope
GND
CH 1
CH 2
To HID terminal on the
Mesuring Board (VFK1308E)

Fig. 2-3

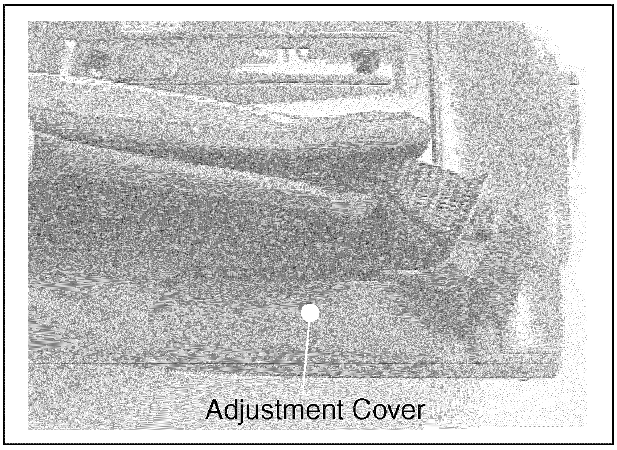

Adjustment Cover

Fig. 2-4

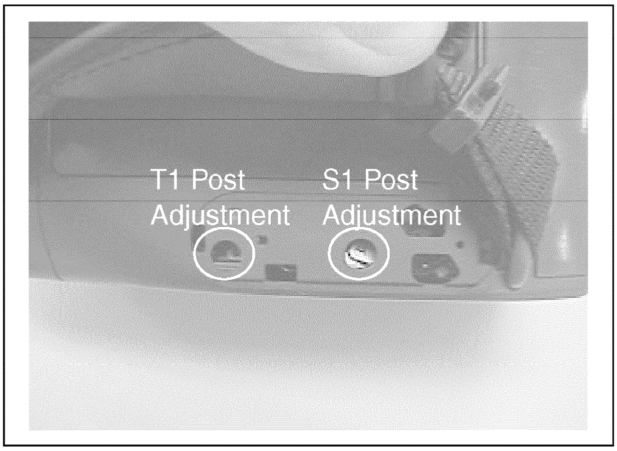
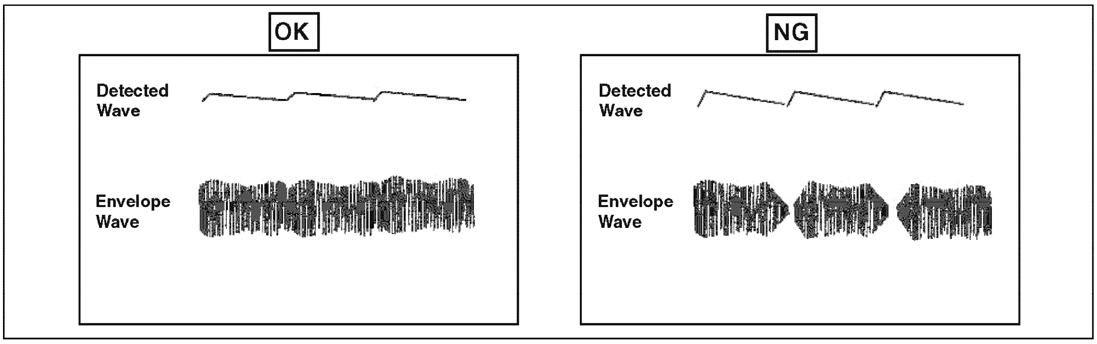
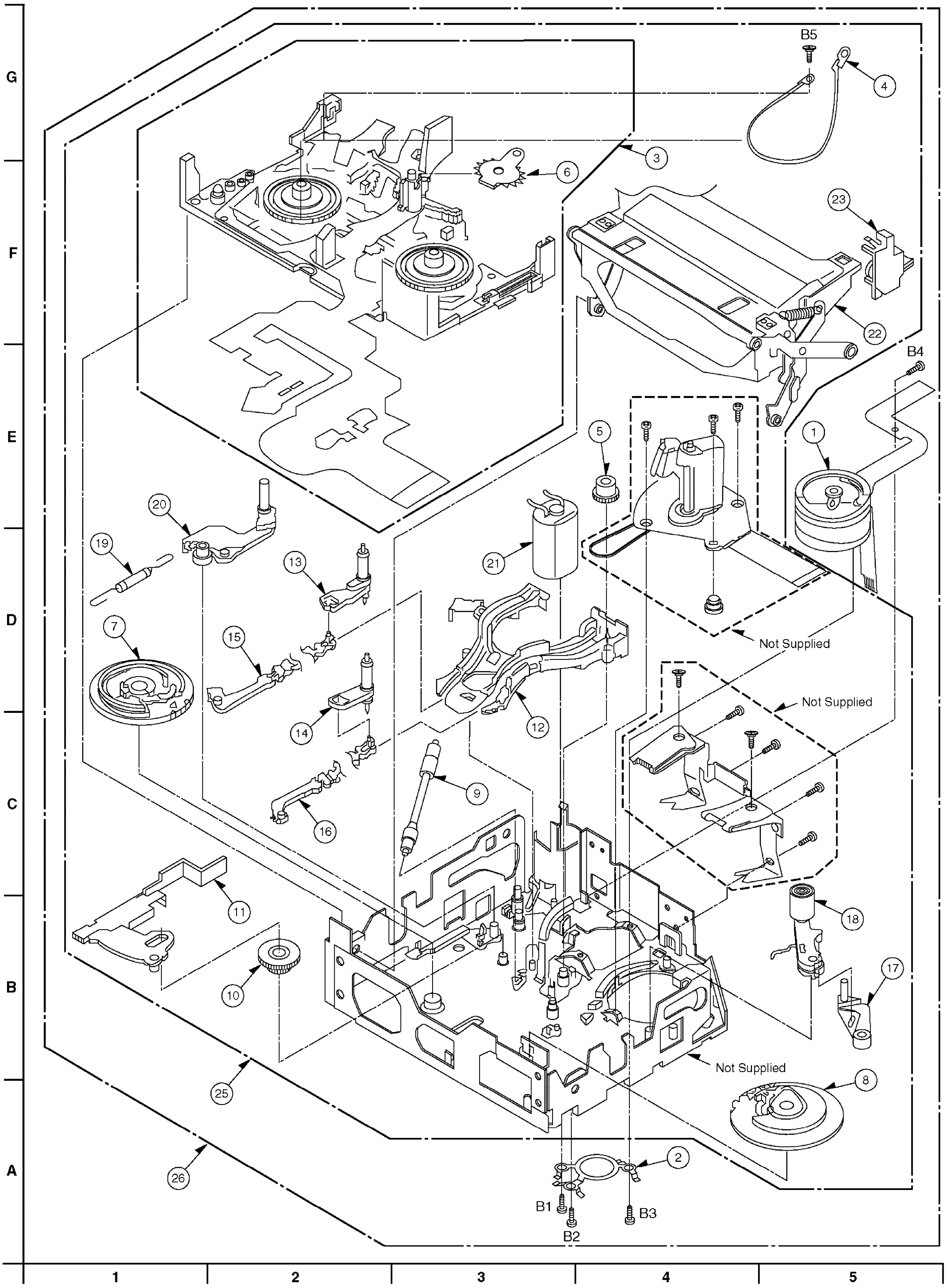

T1 Post
Adjustment
S1 Post
Adjustment

Fig. 2-5


OK
Detected
Wave
Envelope
Wave
NG
Detected
Wave
Envelope
Wave

6. EXPLODED VIEWS

6.1. VCR MECHANISM SECTION


G
F
E
D
C
B
A
B5
4
3
6
23
22
B4
1
5
21
20
19
13
7
15
14
12
9
16
11
10
18
17
25
8
26
2
B1
B2
B3
Not Supplied
Not Supplied
Not Supplied
1
2
3
4
5

7. REPLACEMENT PARTS LIST

7.1. VCR MECHANISM SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
1	VEG1576	CYLINDER U.	
2	VMC1702	CYLINDER SPRING	
3	VXA6999	REEL PLATE U.	
4	VMC1701	TR BAND	
5	VDG1498	CENTER GEAR	
6	VXA6997	IDLER U.	
7	VXA7001	MODE SW U.	
8	VXA7002	T LOAD GEAR U.	
9	VDG1496	CONNECTION WORM	
10	VDG1497	BRAKE GEAR	
11	VMA0J34	TR ROD	
12	VMD4184	RAIL	
13	VXA6995	S-BOAT U.	
14	VXA6996	T-BOAT U.	
15	VMD4181	S-POST LOADING BAND	
16	VMD4182	T-POST LOADING BAND	
17	VXL3096	T3 ARM U.	
18	VXL3095	PINCH ARM U.	
19	VMB3510	TENSION SPRING	
20	VXL3092	TR ARM	
21	VEM0744	LOADING MOTOR U.	
22	VXA7003	GARAGE U.	
23	VXP2111	DUMPER	
25	VXY1629Z1	MECHA. CHASSIS (1) U.	
26	VXY1629	MECHA. CHASSIS	(RTL)
B1	VHD1428	SCREW	
B2	VHD1428	SCREW	
B3	VHD1428	SCREW	
B4	XQN14+B1FN	SCREW	
B5	VMS6968	SCREW	